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ABRIDGEMENTS
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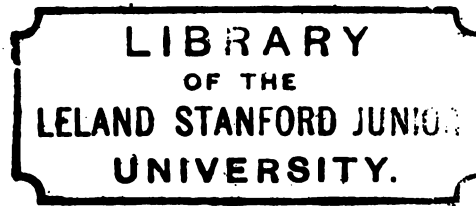
THAT EXPIRED PRIOR TO MAY 1, 1888,

TOGETHER WITH CLASSIFIED LISTS OF ALL THE UNITED
STATES PATENTS RELATING TO CAR HEATING, AND
SOME ANALOGOUS PATENTS GRANTED
PRIOR TO MAY 1, 1888.

COMPILED FROM THE RECORDS OF THE
UNITED STATES PATENT OFFICE

BY
GEORGE P. WHITTLESEY,
LATE ASSISTANT EXAMINER, UNITED STATES PATENT OFFICE.

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1888.



A.599

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GEORGE P. WHITTLESEY.

PREFACE.

The subject of Car Heating is at present exciting widespread attention. New modes of continuous heating, and new methods of lessening the danger from fire in case of accident, are being devised and tested.

It is thought that a brief description of the systems of continuous heating covered by United States patents whose terms have expired, and that have, therefore, become public property, open to everybody, will not only be interesting, but of real service to railroad officers and inventors. Persons who are arranging systems of continuous heating will find in these abridgements what ideas and details of construction they can safely use without infringing existing patents.

In addition to the abridgements, there are given numerical and alphabetical lists showing the inventor's name, the number, and the date of every patent granted prior to May 1, 1888, relating to car heating. Classified lists are also given which will be useful to persons who desire to get copies of all the patents covering certain kinds of car heaters. Following some of these lists will be found references to patents in other classes for analogous devices.

The numbers of the patents that expired prior to May 1, 1888, are printed in **full faced type**.

The Patent Office divides car heaters into three classes only, viz.: Car heaters ; car heaters, pendent ; car heaters, steam. The superiority of the classification adopted in this book will be apparent upon inspection.

The same patent will frequently be found in several of these lists. This is because it contains several modifications, or is of such a character that it falls naturally under any one of three or four headings, and is therefore listed

under all of them in order that each list may be as complete as possible.

Every precaution has been taken to make these lists full and accurate. The sub-classes in the Patent Office classification that have been examined are as follows : Car heaters ; Cars heaters, steam ; Car heaters, pendent ; Car ventilation ; Fire engines, stationary ; Fire engines, chemical ; Freight cars ; Furnace-feeding, air ; House ventilation ; Lamp stoves ; Passenger cars ; Pipe couplings, detachable ; Pipe couplings, valved ; Safety cars ; Sleeping cars ; Spark conductors ; Steam heaters ; Steam and air brakes. There may be a few patents buried in other sub-classes that have not been examined ; but it is certain that they are very few. It is quite possible, however, that some mistakes have crept in, and the author will regard it as a favor if persons who discover an error or an omission will kindly inform him of the fact. Whatever measure of accuracy has been attained is due in part to the courtesy of Examiner Steward in allowing access to the full and complete files of drawings in his Division.

With the hope that the book may prove of value to railway men, inventors, patent lawyers, and others interested, it is submitted to the unerring verdict of the public.

GEO. P. WHITTLESEY.

WASHINGTON, D.C., May 1, 1888.

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Explanation—Independent heaters are those that heat a single car. Continuous heaters heat several cars from one source of heat. Valved couplings contain a valve that closes automatically when the parts of the coupling are separated. Auxiliary heaters have a heater in reserve to be used in case of emergency. Secondary heaters use an intermediate heat conducting medium between the primary source of heat (such as a steam pipe) and the air in the car.

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COPIES OF PATENTS.

A printed copy of the specification and drawing of any patent issued since September 30, 1862, will be sent to any address for twenty-five cents. A copy of the drawing of any patent prior to that date can be furnished, but the specification will have to be copied in manuscript at a charge of ten cents per one hundred words.

In lots of ten or more, printed copies will be furnished at fifteen cents each.

Be sure to give the number of the patent correctly.

Orders sent to Whittlesey & Wright, patent lawyers, Washington, D. C., will be promptly attended to.

ABRIDGEMENTS
OF THE
UNITED STATES PATENTS PERTAINING TO
CONTINUOUS CAR HEATING
THAT EXPIRED PRIOR TO MAY 1, 1888.

4,654. *July 24, 1846.* TAPPEN TOWNSEND, Albany,
N. Y.

HOT AIR.

Cast-iron pipe or pipes, with bell mouth at front of engine, pass through furnace and connect with reservoir under running board.

Reservoir connected by flexible couplings with air chambers under cars, which have registers opening into cars, one at each end, and provided with caps to close them if necessary.

5,325. *October 9, 1847.* LEWIS KIRK, Reading, Pa.

COUPLING FOR STEAM PIPES.

The ends of the supply pipes are connected with short vertical pipes, each turning on its vertical axis in a stuffing box. From each side of the upper end of this pipe projects a horizontal branch, on which is swiveled the forked end of a connecting pipe. The two connecting pipes are joined by a telescopic joint. All the joints are packed. The vertical turning pipes allow lateral vibration, the swivel forks provide for vertical movements, and the sliding joint allows to and fro movement of the cars.

20,021. *April* 30, 1858. CALVIN PEPPER, Albany, N. Y.
HOT AIR.

Air drawn in by motion of train through chamber containing water, to purify it; heated by stove, on engine or in baggage car; and passed through pipes in ceiling and floor of cars, in which are registers. May have heater in each car connected with pipes.

32,843. *July* 16, 1861. GEORGE W. SAMSON, Washington, D. C.

STEAM.

Exhaust steam conducted from locomotive to radiators in each car. Between the cars are peculiar couplings, formed of three hollow links, each link composed of two parallel pipes with an elbow at each end, and a T coupling between each pair of elbows, the T's being joined by short pipes.

This allows both vertical and horizontal movement of the coupling.

67,894. *August* 20, 1867. A. J. MARSHALL, Warrenton, Va.

AIR.

Fan at front of engine operated by steam engine forces air through a pipe to cars.

Pipe forms a double roof to cars. Flexible couplings of rubber cloth. May have a second roof above air-pipe. Under the roof are secondary conduits, one on each side of the car, for conveying the air to upright pipes running down by each seat with a register. Secondary conduits may be hollow cornices. May have flexible hose hanging down to each seat to supply air where wanted. Adjustable spring exit valves in sides of car to allow escape of air. May have similar valves in conduit to relieve pressure. Each car has a stove with a casing. Air

admitted from conduit to casing in winter time to warm it. It is then conducted through a pipe along the car beneath the seats. Branch passages between the seats have registers, and serve as footrests.

72,258. *December 17, 1867.* CHARLES R. ABBOT, Elmira, N. Y.

COUPLING FOR STEAM PIPES.

The coupling pipe is in two parts, one telescoping in the other through a packed joint. On the ends of this coupling are balls that are held in ball sockets on the ends of the supply pipes. The sockets are made in two parts, and can be tightened upon the balls by screws.

73,781. *January 28, 1868.* ROBERT A. CHESEBROUGH, New York, N. Y.

STEAM.

Live or exhaust steam from locomotive. Pipes at top or bottom of cars. One on each side, or single one through the middle of top, or with one branch inside and another outside. Pipes encased in jackets, *i. e.*, air heating flues or chambers, with registers to admit air into car, or turn it out of doors. Jacket omitted when one outside and one inside branch is used. In this arrangement steam may flow through any one or more of the cars at will by operating suitable valves.

Steam may be returned to engine through another pipe or set of pipes, and used to increase draft or heat feed water. Pipes connected by flexible pipes not described.

74,386. *February 11, 1868.* SAMUEL LLOYD, Washington, D. C.

HOT OR COOL AIR.

Bell mouth at front of engine. Pipe runs back under cars. Branch coiled in smoke-stack and

smoke-box, to heat air. Independent heating and forcing apparatus on special car. Reversible hoods underneath to catch air. Pipe coiled in furnace and also around outside of same. Air delivered to blower (fan) and forced through water to purify it. Agitator in water to stir it. Caloric engine to operate blower and agitator. Latter may be run by belt from car-axle. Hot air from caloric engine is deodorized and passed through water-tank to cars. Air may pass directly to water-tank from furnace and caloric engine without passing through blower. Cool air may be taken through one hood, directly into water-tank, either through blower or simply by motion of train. Supply pipes run under the cars and may be jacketed. Registers open into cars.

Couplings made by screw joints. Male screw on end of car pipe. Coupling pipe with female screw at one end, and a nozzle at each end. Nozzles slide into end of car pipe. Rubber packing keeps them tight. Coupling pipe consists of a flat steel spiral attached to the nozzles, covered first with duck, then with vulcanized rubber, and a cover of leather.

74,899. *February 25, 1868.* D. H. DOTTERER, Philadelphia, Pa.

HOT OR COOL AIR.

Special car for heating. Steam boiler with air casing. Steam and water pipes running outside of boiler from top to bottom to assist in heating the air inside the casing. Boiler supplies steam to engine driving a fan. Air taken from inside the car and forced into casing, passing thence to supply pipes running under cars. Registers admit air to cars. Rubber coupling pipes. There are two supply pipes, one on each side of car. Their forward ends, under the heating car, are connected. May

force air into supply pipes without passing it through the heater.

76,175. *March* 31, 1868. GEORGE W. EDDY, Waterford, N. Y.

STEAM.

Takes steam from exhaust of locomotive or from boiler, or from separate generator located on engine, tender or baggage car, or on separate special car, or each car may have a separate generator. Steam pipe rises through floor of car on each side and runs along to other end, where it descends through floor to unite with coupling. Under each seat is a U-shaped branch. Check valve in main pipe between ends of branch, to regulate flow of steam. May have but one valve, at rear end of car. Main pipes inclined towards end of car, and branches inclined towards main pipe, to drain them. Minute drip pipe in the flexible coupling pipe, or an orifice, or a pet cock in steam pipe, near coupling. Pipes may be placed in a recess in floor of car, or have slats over them.

77,270. *April* 28, 1868. SAMUEL W. FRANCIS, Newport, R. I.

HOT AIR.

Bell mouth at front of engine, protected from rain by a hood. Pipe runs through smoke-box, and thence either through boiler or underneath it to fire-box, where it divides and passes through it along each side and on each side of the tender to the rear of latter. Here it unites and is coupled to a pipe running under the seats in the car, said pipe dividing and passing along each side of car above the floor. Air admitted to the car through registers. Coupling formed by a nozzle entering a bell mouth, with packing around rim of bell mouth. When the pipe passes under the boiler, it is encased in a jacket

to confine a body of heated air around the pipe. In summer the casing may be removed, and cool air taken in through the same pipe.

77,331. *April* 28, 1868. THOMAS SPEAKMAN, Camden, N. J.

COUPLING FOR STEAM OR AIR PIPES.

Bell mouth on one part, into which slides the end of a flexible, wire-wound rubber tube attached to the other part, which consists of a chamber with a recess to receive the pin of the car-coupler. Under each car are reservoirs, into which steam or air is admitted. If air is used, the car floor may be perforated to allow it to escape.

77,871. *May* 12, 1868. ARCHIBALD C. CRARY, Utica, N. Y.

STEAM.

Steam boiler in smoke stack of engine. Steam pipes and radiators in cars. May use live or exhaust steam from locomotive, if other boiler is insufficient.

Coupling consists of tube with bell mouth for female part, and tube connected with ball and socket joint to supply-pipe on car, for male part. Male part pressed outward by spiral spring. Yielding rest to support coupling. Compound joint in supply pipes to permit oscillation of cars.

78,134. *May* 19, 1868. HENRY R. ROBBINS, Baltimore, Md.

COUPLING FOR STEAM PIPES.

This is a "flexible self-adjustable joint," forming "an entirely metallic connection." The end of the supply pipe on one car is vertically swiveled in the floor of the car, and has below the floor a short horizontal laterally projecting arm, on which is movably jointed a pipe extending beyond the end of

the car and terminating in a bell mouth. The supply pipe on the other car is similarly swiveled in the floor, but below the floor has a long T, one arm of which extends about to the end of the car. In this arm slides a pipe projecting beyond the end of the car and entering the bell mouth of the other part of the coupling. A spring keeps this sliding pipe pressed against the bell mouth. On each of these abutting pipes is a bellshaped cap, sliding air tight upon the pipes. One of them is forced by a spiral spring against the other, which is made in two longitudinal halves and united by hoops. This gives flexibility when the cars pass around a curve. 78,990. *June 16, 1868.* ALBERT C. MINER, Philadelphia, Pa.

STEAM.

Cast-iron box extends under aisle of car. Steam admitted to this box from pipe running under the cars from boiler of engine. Gauge in sight of engineer to indicate pressure in pipe. Safety-valve on pipe to relieve over pressure. Provides valves to admit steam directly to cars to extinguish fire.

80,505. *July 28, 1868.* JOHN RICE, Bloomington, Ind.

HOT AIR.

Furnace suspended under baggage car. Air pipes pass through fire-box and smoke pipes, thence under the cars. Coupling consists of a ball and bell-mouth pipe. Packing in a groove around ball. Ball slides freely into pipe and withdraws when car separates. Flexible ball and socket joint in pipe near coupling.

81,137. *August 18, 1868.* C. CARPENTER, Buffalo, N. Y.

STEAM OR HOT AIR.

Fan or tender driven from axle, forces air through a pipe which is coiled in a heater on the tender;

thence through upper part of cars. Valves and registers control supply of heated air to each car.

Steam pipe from locomotive boiler enters air pipe near fan. In each car is a radiator connected with supply pipe. When train is standing still, steam may be admitted to radiators to heat them. When running, hot air is to be used.

81,211. *August 18, 1868.* E. L. ROBERTS, New York, N. Y.

HOT AIR.

Bell mouth at front of engine. Supply pipe passes over tops of cars, or along sides near top, or within car near top. Preferably uses two supply pipes, one on each side. Numerous small tubes opening into car from supply pipe. Small tubes may have flattened or spread out at lower ends, perforated. Automatic valves in supply pipe to regulate and relieve the pressure. Shows but does not describe a peculiar coupling for air pipe. Exhaust pipes, preferably one on each side, underneath car, communicate with car by short passages through or near the floor. Automatic valve at each end of exhaust pipe. Rear one opens and motion of trains sucks out foul air from lower part of car.

Heater arranged in baggage car. Steam boiler supplies steam to a jacket surrounding the air pipe. Air pipe may be corrugated to give greater surface. Drip pipe returns water of condensation to boiler. May take steam from locomotive boiler instead. Or, hot air may be used instead of steam to heat the supply pipe.

81,322. *August 25, 1868.* IRA R. AMSDEN, Buffalo, N. Y.

HOT AIR.

Special car with heating and forcing apparatus may be placed anywhere in train. Furnace is sur-

rounded by a chamber with baffle-plates to cause air to take a zigzag course in passing through it. Air enters a closed chamber, in which is a fan, driven from car-axle. May be driven by hand when train stops. Supply pipe from fan divides and passes into cars at each end through floor; continues along under seats and passes down through floor at other end. Registers admit air to car. May conduct the exhaust steam into the furnace space, to assist in heating the air.

In summer, ice or water may be placed in the furnace space or in the casing to cool the air and free it from dust.

81,572. *September 1, 1868.* SQUIRE AINSWORTH, Pittsburg, Pa.

COUPLING FOR STEAM PIPES.

At the end of each supply pipe is an arrangement of three elbows swiveled together by means of ground tapered joints and threaded unions. The outer elbow of each set is united to a short length of pipe, and the two pipes are coupled by a swiveled elbow. These pipes form a V. The unions may be made in two parts and either jointed together so as to open and release the elbow, or clamped by spring hooks. Chains are provided to open the unions and uncouple the pipes when the cars separate.

81,873. *September 8, 1868.* HIRAM M. BRITTON, Cincinnati, O.

HOT AIR.

Bell mouth at front of engine. Air conducted to casing surrounding furnace in baggage car. Pipes from casing take hot air to a fan, driven from car-axle. Two supply pipes conduct air to cars, passing underneath them.

Branches with registers project up into car. Fan may be driven by hand when train stops. In summer, a refrigerating apparatus may take the place of the furnace.

82,210. *September 15, 1868.* W. B. FARWELL, New York, N. Y.

STEAM.

Improved coupling and steam trap. Take steam from locomotive boiler. Supply pipe coiled in a box under the car floor, which is perforated to admit the warm air. Pipes are inclined to drain the water to the traps, from which it is automatically discharged by ball valve or siphon. Coupling consists of two similar bell mouthed pipes, united to ends of supply pipes by ball and socket joint. In each the bell mouth is an annular packing ring through which slides the end of a straight coupling pipe.

82,885. *October 6, 1868.* THOMAS SMITH and JOHN O'REILLY, Baltimore, Md.

HOT AIR.

Special car for heating and forcing apparatus; or, may put heater, etc., in baggage or other car. Air-pump driven from car-axle, compresses air into chambers within which is a furnace. Hot air admitted to a spirally corrugated elastic supply pipe underneath the cars. Bayonet-joint coupling, with ball and socket joint on one part of same. Closed radiator in car. Automatic valves to regulate supply of air to radiator. The automatic valves have spindles by which they can be closed or held open when desired. Safety valve to relieve pressure in radiator. Perforated pipes along each side of car near floor, to which air may be admitted from the radiator, if desired.

83,076. *October 13, 1868.* FRANCIS M. MEDDOCK,
Mainsville, Ohio.

STEAM.

Improved piping of car.

Takes steam direct from locomotive, or from exhaust.

Floor of car is double, forming a steam chamber. It is made of metal jacketed. Steam pipe arranged longitudinally within the chamber, with short branches, each of which has a valve, the valve stem projecting up through the top-plate of the steam-chamber. Drip cocks allow discharge of air, condensed steam, etc., from the chamber.

83,118. *October 13, 1868.* WILLIAM H. YEATON, Philadelphia, Pa.

COUPLING FOR STEAM PIPES.

In one part of the coupling is a chamber or socket, into which fits a hollow arm or tenon on the other part, and against gaskets to make a tight joint. A yoke, pivoted on the socketed part, turns up over the other part and holds them together. A plug-cock in the rear of the socket opens and closes the pipe. The handle of the plug acts as a stop when the pipe is open, to prevent the yoke from slipping off. The pipe must be closed before the yoke can be moved and the parts uncoupled. When separated, a hinged cover closes the mouth of the socket and keeps out dust.

83,488. *October 27, 1868.* JOHN R. GUY, Springfield, O.

HOT AIR.

Chamber in baggage-car, with furnace inside of it. Fan in chamber, driven from car axle, forces air through supply pipe to registers in cars.

Coupling consists of a short straight length of pipe, with ball at each end made of copper.

Balls fit into flaring sockets on ends of supply pipes.

May use elastic packing. May use this coupling for steam or for gas for illuminating. May have two furnaces and two sets of supply pipes, to be used alternately as car runs in opposite directions. May force cold air in summer.

84,969. *December 15, 1868.* ELIHU SPENCER, Elizabeth, N. J.

HOT AIR.

Locomotive grate has hollow bars into which air passes through downwardly extending funnels at front of fire-box. May take the air at the front of the engine, closing the other entrances, in heavy snows. Air, passing through hollow grate bars, enters two supply-pipes under cars, united by flexible couplings, and enters cars through registers in the aisle connected with both pipes. Circulation produced by motion of train. When train is at rest, circulation is induced by the fact that the openings for the entrance of air are lower than the grate bars, while the registers are higher. Grate bars may also be inclined upwardly from front to rear to assist circulation.

85,377. *December 29, 1868.* GEORGE A. FULLERTON, Lynn, Mass.

COUPLING FOR STEAM PIPES.

Under the end of each car is a hanger, from which is suspended, so as to slide longitudinally on the hanger, a tapering section of pipe. A spring forces it normally outward. On one of these tapering pipes is a rubber-lined cylinder into which the tapering ends of the pipes are forced when the cars are coupled, thereby making a tight connection between them. A stiff spring on each part of the coupling enters a forked socket on the opposite

part, and holds the parts removably together. Stops limit the extent of outward sliding movement of the parts and compel them to uncouple when the cars separate.

85,559. *January 5, 1869.* MARLIN S. BOLT, Elmira, N. Y.

COUPLING FOR HOT AIR OR STEAM PIPES.

On each car is a downwardly projecting elbow. Connected to the end of this by a joint is another elbow, swinging in a horizontal plane. To the end of this is connected a third elbow swinging in a vertical plane. These last two elbows are coupled by a straight pipe, fastened to one of them and sliding in the other, with packing to make it tight.

85,712. *January 5, 1869.* ASA WEEKS, Minneapolis, Minn.

HOT AIR.

Under tender or baggage car is a furnace, which may be fed through floor of car. Chamber surrounds furnace through which pass smoke flues to stack. Air admitted to chamber through register in its bottom, adjustable from car. Hot air flows through supply pipes on each side of cars. Automatic coupling, consisting of straight pipes on one car entering bell mouth on other; so arranged on opposite sides of car as to match properly whichever end of car is presented. Both straight pipe and bell mouth are united to supply pipe by ball and socket joint. A curved spring holds them normally in line, but allows lateral or other vibration. In each part of the coupling is a valve, opened automatically when parts come together. Air enters hot-air chamber under floor of car, from which it passes through register into car. May have a lattice work instead of register.

May put a shallow box along under the seats in old cars, to take the place of the hot-air chamber under the floor. Instead of the furnace, may use for heating the air a coil of pipe supplied with steam from the boiler. In summer, cool air may be taken through front of heating chamber, or at front of engine.

87,472. *March 2, 1869.* ARCHIBALD C. CRARY, Utica, N. Y.

STEAM.

An automatic valve controls pressure of steam in supply pipe, which passes from exhaust nozzle through boiler and fire-box to cars. In the smoke-box is a separate steam generator, also connected with the supply pipe.

Coupling is provided with valves, which close automatically when parts are uncoupled, to prevent escape of steam.

88,852. *April 13, 1869.* ARCHIBALD C. CRARY, Utica, N. Y.

STEAM

Takes steam from locomotive.

Car has double floor to inclose a set of steam pipes. Under each seat is a foot-rest with slotted top to admit warm air from double floor to car.

Condensed steam is drained into traps at each corner of the car. Ball valves automatically discharge the water into pipes that return it to an air-tight tank, from which the air is exhausted, and from which the hot water can be fed to the boiler.

May have a steam chamber under the car in place of the set of pipes. May retain the hot water in the car to supply heat, when the locomotive is detached.

89,529. *April 27, 1869.* ASA WEEKS, Minneapolis, Minn.

HOT AIR.

Hung beneath one of the forward cars is a furnace, fed from within the car, and having its smoke flues surrounded with a hot-air chamber. Cold air is admitted to the chamber through a register. The furnace-dampers and the air-register are controlled by handles projecting into the car. The furnace can be removed in warm weather and cool air taken directly into the supply pipes.

The heated air is carried through pipes under the cars and up to the roof of each one, where it enters the car through registers. In each car is a drum with double walls. The space between these walls, and also the interior of the drum, communicate with a pipe running up through the roof of the car. In the outer wall of the drum are registers, through which the foul air is driven into the inter-wall space and up through the pipe. In case the train is stalled, a fire can be built inside the drum.

91,524. *June 22, 1869.* ARCHIBALD CRARY, Utica, N. Y.

STEAM.

Takes steam from the locomotive, but has a separate generator in the baggage car, to be used in case of necessity. Condensed steam is returned to a tank partially surrounding this generator. A pump driven by an eccentric on the car-axle feeds the boiler of this generator.

91,824. *June 29, 1869.* DEWITT C. CHIPMAN, Noblesville, Ind.

HOT AIR.

Air taken through bell mouth at front of baggage car into casing around heater; thence through pipe to cars.

Coupling consists of bell mouth on each car, yieldingly attached to supply pipe. Bell mouths abut and can slide laterally on each other. Within them is a loose section of straight pipe extending from small end of one bell mouth to small end of the other. Safety chain to prevent its loss.

95,528. *October 5, 1869.* THOMAS SMITH, Baltimore, Md.

COUPLING FOR HOT-AIR PIPES.

An arm or tenon on one part enters a socket in the other part. The arm is hollow and an opening on one side of it registers with an opening in one wall of the socket, thus forming a continuous passageway through the coupling. A set screw clamps the arm in the socket. Each part has a spring pressed valve. The stems of the valve abut where the parts are united, thus pressing back and opening each valve.

May use only one valve, or none at all. The stems may be arranged not to abut.

This coupling uncouples automatically when subjected to strain.

96,945. *November 16, 1869.* THOMAS N. MORSE, Fairhaven, Mass.

HOT AIR.

Boiler in baggage car. Fan driven from car axle or by special engine connected with boiler. Air pipe passes through fire-box and is coiled in water and steam space of boiler. Hot air supply pipe runs under the cars, swerving aside at each end to clear the car coupling. Air admitted to cars through registers. Coupling consists of ball socket on ends of supply pipe on each car. A hollow ball is held to its seat in each socket by springs. Short tube extends from one side of ball. Diametrically opposite is an open-

ing through the ball. When this opening is in line with the supply pipe, air can flow through. When disconnected, the tube falls, turning the ball and shutting off the air. The short tube on one car slides into or outside of that on the next car. To connect them, the balls must be dislocated, the tubes slipped together, and then the balls returned to their sockets. Supply pipes may be jacketed. In summer, may fill boiler with ice to cool the air.

99,003. *January* 18, 1870. HENRY R. ROBBINS, Baltimore, Md.

COUPLING FOR STEAM PIPES.

The end of one supply pipe has attached to it a hemisphere into which screws another hemisphere on the other supply pipe, thus forming a ball. The latter supply pipe has a spherical flange, fitting inside of its respective hemisphere. A spiral spring surrounds the pipe between the hemisphere and a collar on the pipe, and keeps the joint tight between the hemisphere and the flange.

100,333. *March* 1, 1870. FREDERICK SHALLER, Hudson, N. Y.

STEAM.

Attaches to the end of the supply pipe at the rear of the train a spring safety valve, which allows the condensed steam to escape, and relieves undue pressure. A screw and nut enable tension of the spring to be regulated.

100,896. *March* 15, 1870. FREDERIC R. HUNT, Leavenworth, Kansas.

COUPLING FOR AIR PIPES.

Constructs the draw-heads and couplings in such a way as to serve as connecting pipes for the passage of hot or cold air. The draw-head is hollow, and is connected with the supply pipe under the car,

which branches at the king-bolt. Four hook-shaped catch-plates are hinged upon the draw-head, forming a square box. The corners are filled in by V-shaped stationary bars secured to the draw-head. Springs keep the catch-plates normally in contact. The coupling bar is a short pipe with heavy flanges, beveled to more easily enter between the ends of the catch-plates.

Suitable levers enable the plates to be forced apart to allow the coupling pipe to escape.

110,114. *December 13, 1870.* JOSEPH CONNER, Philadelphia, Pa.

COUPLING FOR STEAM PIPES.

On the end of one supply pipe is a horizontal pipe capable of sliding longitudinally to a slight extent and also of turning on its axis. Attached to this by an elbow is another piece of pipe, and then a T vertically disposed and connected with an opposing T on the other car, by short U-shaped lengths of pipe, that turn in stuffing boxes at each end of the T's. The second T is connected with a pipe provided with a ring having radial arms that engage with helical slots in a sleeve mounted upon the supply pipe belonging to that car. The sleeve is threaded and when turned to draw the arms into the slots it also moves back upon the supply pipe, thus bringing the end of the pipe into close contact with the pipe connected with the T. A ratchet and pawl lock the turning sleeve.

ALPHABETICAL LIST OF PATENTS PRIOR TO MAY 1, 1888.

(Expired patent numbers are printed in bold-faced type.)

PATENTEE.	NUMBER.	DATE.
C. R. Abbott - -	72,258	Dec. 17, 1867.
S. Ainsworth - -	81,572	Sept. 1, 1868.
J. G. Allen - -	107,149	Sept. 6, 1870.
J. G. Allen - -	116,914	July 11, 1871.
W. A. Allen - -	82,373	Sept. 22, 1868.
Allen & Campbell -	70,495	Nov. 5, 1867.
J. Amory - -	163,908	June 1, 1875.
J. R. Amsden - -	81,322	Aug. 25, 1868.
E. H. Ashcroft - -	54,662	May 15, 1866.
Reissued - -	2,917	April 14, 1868.
	6,652	Sept. 21, 1875.
	7,967	Nov. 27, 1867.
P. M. Askren - -	379,628	Mar. 20, 1888.
T. B. Atterbury - -	127,945	June 18, 1872.
B. T. Babbitt - -	12,306	Jan. 30, 1855.
R. M. Bache - -	376,275	Jan. 10, 1888.
G. A. Badger - -	219,898	Sept. 23, 1879.
G. W. Baird - -	237,233	Feb. 1, 1881.
E. Baker - -	244,785	July 26, 1881.
W. C. Baker - -	58,755	Oct. 16, 1866.
W. C. Baker - -	71,948	Dec. 10, 1867.
W. C. Baker - -	75,345	Mar. 10, 1868.
W. C. Baker - -	244,108	July 12, 1881.
W. C. Baker - -	244,522	July 19, 1881.
W. C. Baker - -	209,793	Nov. 12, 1878.
W. C. Baker - -	253,253	Feb. 7, 1882.
W. C. Baker - -	331,367	Dec. 1, 1885.
W. C. Baker - -	353,839	Dec. 7, 1886.
W. C. Baker - -	374,336	Dec. 6, 1887.
W. C. Baker - -	380,544	April 3, 1888.
W. H. Baldwin - -	258,542	May 30, 1882.

PATENTEE.	NUMBER.	DATE.
J. H. Ballard - -	366,445	July 12, 1887.
J. L. Bangley - -	367,393	Aug. 2, 1887.
S. H. Barrett - -	374,169	Dec. 6, 1887.
C. Bassini - -	377,057	Jan. 31, 1888.
J. C. Bates - -	185,474	Dec. 19, 1876.
W. H. Beal - -	87,532	Mar. 9, 1869.
G. Beeman - -	102,080	April 19, 1870.
E. B. Benham - -	381,754	April 24, 1888.
G. H. Benjamin - -	368,906	Aug. 23, 1887.
G. H. Benjamin - -	376,061	Jan. 10, 1888.
J. Berg - -	235,847	Dec. 28, 1880.
J. Berg - -	226,220	April 6, 1880.
J. Berg - -	229,854	July 13, 1880.
Berghauser & Kiesling	144,183	Nov. 4, 1873.
E. M. Berment - -	211,214	Jan. 7, 1879.
F. S. Bissell - -	205,467	July 2, 1878.
F. S. Bissell - -	205,468	July 2, 1878.
R. C. Blackall - -	259,463	July 13, 1882.
M. S. Bolt - -	85,559	Jan. 5, 1869.
G. C. Bovey - -	211,963	Feb. 4, 1879.
G. C. Bovey - -	227,345	May 11, 1880.
F. G. Botsford - -	374,447	Dec. 6, 1887.
Bradley & Fulghum - -	128,103	June 18, 1872.
E. L. Brady - -	210,910	Dec. 17, 1878.
Brase & Salladay - -	103,839	June 7, 1870.
R. O. Brien - -	78,475	June 2, 1868.
J. L. Brink - -	362,928	May 17, 1887.
J. Briscoe - -	378,284	Feb. 21, 1888.
H. M. Britton - -	81,873	Sept. 8, 1868.
Brockway & Watts - -	267,667	Nov. 21, 1882.
R. H. Brown - -	302,707	July 29, 1884.
W. Brown - -	370,853	Oct. 4, 1887.
A. S. Brownell - -	207,588	Sept. 3, 1878.
O. Bryan - -	364,799	June 14, 1887.
C. Carpenter - -	81,137	Aug. 18, 1869.
S. P. Canfield - -	365,237	June 21, 1887.

PATENTEE.	NUMBER.	DATE.
J. F. Callaway - -	195,792	Oct. 2, 1877.
L. Capron - -	190,002	April 24, 1877.
J. S. Case - -	366,761	July 19, 1887.
Casselman & McGann	376,138	Jan. 10, 1888.
A. C. Crary - -	77,871	May 12, 1868.
A. C. Crary - -	87,472	Mar. 2, 1869.
A. C. Crary - -	88,852	April 13, 1869.
A. C. Crary - -	91,524	June 22, 1869.
F. & J. Chalfant - -	159,541	Feb. 9, 1875.
J. E. Chapin - -	221,153	Nov. 4, 1879.
J. E. Chapin - -	221,154	Nov. 4, 1879.
J. H. Chambers - -	370,606	Sept. 27, 1887.
B. Chamberlain - -	259,976	June 20, 1882.
R. A. Cheseborough -	73,781	Jan. 28, 1868.
D. C. Chipman - -	91,824	June 29, 1869.
D. C. Chipman - -	194,331	Aug. 21, 1877.
A. R. Chisholm - -	358,382	Feb. 22, 1887.
M. J. Clark - -	80,393	July 28, 1868.
R. Coddington - -	372,061	Oct. 25, 1887.
E. D. Cody - -	329,017	Oct. 27, 1885.
J. B. Collin - -	222,246	Dec. 2, 1879.
J. M. Comins - -	106,124	Aug. 9, 1870.
L. R. Comstock - -	89,027	April 20, 1869.
R. G. S. Collamore -	269,637	Dec. 22, 1882.
W. F. Condon - -	200,697	Feb. 26, 1878.
W. F. Condon - -	210,918	Dec. 17, 1878.
W. F. Condon - -	250,502	Dec. 6, 1881.
W. F. Condon - -	263,118	Aug. 22, 1882.
W. F. Condon - -	277,546	May 15, 1883.
F. C. Conley - -	199,414	Jan. 22, 1878.
D. Connell - -	379,101	Mar. 6, 1888.
C. C. Converse - -	62,254	Feb. 19, 1867.
Reissued - -	7,506	Feb. 12, 1877.
H. P. Cope - -	365,730	June 28, 1887.
R. Cornelius - -	14,348	Mar. 4, 1856.
F. J. Crouch - -	380,247	Mar. 27, 1888.

PATENTEE.	NUMBER.	DATE.
L. K. Curlett - -	374,659	Dec. 13, 1887.
N. Curtis - -	376,075	Jan. 10, 1888.
J. Dahmer - -	146,990	Feb. 3, 1874.
S. Darling - -	79,449	June 30, 1868.
S. A. Darrach - -	372,605	Nov. 1, 1887.
A. Davidshon - -	84,735	Dec. 8, 1868.
H. G. Dayton - -	54,872	May 22, 1866.
B. R. Deacon - -	372,363	Nov. 1, 1887.
G. K. Dearborn - -	34,280	Jan. 28, 1862.
W. S. Deeds - -	147,829	Feb. 24, 1874.
W. S. Deeds - -	149,842	April 21, 1874.
H. C. Dennis - -	371,178	Oct. 11, 1887.
S. L. Denny - -	80,927	July 30, 1868.
E. Densmore - -	152,615	June 30, 1874.
W. E. Depp - -	365,975	July 5, 1887.
M. B. Derrick - -	370,049	Sept. 20, 1887.
W. D. DeRush - -	215,335	May 13, 1879.
G. W. Dinsman - -	189,086	April 3, 1877.
R. M. Dixon - -	379,691	Mar. 20, 1888.
D. H. Dotterer - -	74,899	Feb. 25, 1868.
W. L. Drake - -	147,248	Feb. 10, 1874.
J. Dripps - -	78,074	May 9, 1868.
J. Dripps - -	82,810	Oct. 6, 1868.
J. R. Drodzewski - -	348,664	Sept. 7, 1886.
J. R. Drodzewski - -	363,374	May 24, 1887.
J. R. Drodzewski - -	377,065	Jan. 31, 1888.
U. J. Duffield - -	194,418	Aug. 21, 1877.
W. C. Dunn - -	343,445	June 8, 1886.
W. C. Dunn - -	359,206	Mar. 8, 1887.
W. C. Dunn - -	365,977	July 5, 1887.
P. Dufresne - -	371,558	Oct. 18, 1887.
W. H. Durant - -	376,239	Jan. 10, 1888.
Eastman, Kimball & Murch	248,924	Nov. 1, 1881.
Eastman, Kimball & Murch	247,028	Sept. 13, 1881.
W. E. Eastman - -	269,189	Dec. 19, 1882.
W. E. Eastman - -	253,521	Feb. 14, 1882.

PATENTEE.	NUMBER.	DATE.
R. Eaton - - -	54,830	May 15, 1866.
J. C. Eckert - - -	83,142	Oct. 20, 1868.
G. W. Eddy - - -	76,175	Mar. 31, 1868.
G. M. Edwards - - -	266,794	Oct. 31, 1882.
J. Emerson - - -	314,006	Mar. 17, 1885.
J. Emerson - - -	314,007	Mar. 17, 1885.
J. Emerson - - -	372,303	Nov. 1, 1887.
F. E. Ensign - - -	208,013	Sept. 17, 1878.
J. T. Even - - -	117,059	July 18, 1871.
Ewins and Wisewell -	258,394	May 23, 1882.
T. T. Farnsworth - -	205,069	June 18, 1878.
W. B. Farwell - - -	82,210	Nov. 15, 1868.
J. A. Faust - - -	336,221	Feb. 16, 1886.
H. Fenton - - -	379,947	Mar. 27, 1888.
T. B. Field - - -	161,108	Mar. 23, 1875.
Fife and Pickenpaugh	287,268	Oct. 23, 1883.
M. D. Fitzgerald - -	252,752	Jan. 24, 1882.
W. Flanagan - - -	375,738	Jan. 3, 1888.
J. J. Flynn - - -	344,645	June 29, 1886.
G. F. Foote - - -	45,437	Nov. 29, 1864.
J. A. Forbes - - -	303,566	Aug. 12, 1884.
E. B. Forbush - - -	27,212	Feb. 21, 1860.
J. W. Fowler - - -	366,087	July 5, 1887.
S. W. Francis - - -	77,270	April 28, 1868.
H. E. Freese - - -	325,796	Sept. 8, 1885.
W. M. Fuller - - -	148,440	Mar. 10, 1874.
W. M. Fuller - - -	274,753	Mar. 27, 1883.
G. A. Fullerton - - -	85,377	Dec. 29, 1868.
J. L. Hadden - - -	246,610	Sept. 6, 1881.
G. Gibbs - - -	375,547	Dec. 27, 1887.
J. F. Gibson - - -	301,713	July 8, 1884.
J. Gibson - - -	60,714	Jan. 1, 1867.
Reissued - - -	33,029	July 14, 1868.
J. Gibson - - -	98,248	Dec. 28, 1869.
A. J. Gibson - - -	84,740	Dec. 8, 1868.
Gilbert and Long - -	377,934	Feb. 14, 1888.

PATENTEE.	NUMBER.	DATE.
G. W. Glass - - -	373,732	Nov. 22, 1887.
E. E. Gold - - -	242,299	May 31, 1881.
E. E. Gold - - -	253,693	Feb. 14, 1882.
E. E. Gold - - -	309,299	Dec. 16, 1884.
E. E. Gold - - -	349,991	Sept. 28, 1886.
B. Goldsmith - - -	371,059	Oct. 4, 1887.
S. N. Goodale - - -	47,943	May 30, 1865.
Reissued - - -	4,779	Mar. 5, 1872.
S. N. Goodale - - -	123,776	Feb. 20, 1872.
A. C. Goodell - - -	192,067	June 19, 1877.
H. A. Gouge - - -	184,858	Nov. 28, 1876.
H. A. Gouge - - -	234,666	Nov. 23, 1880.
P. Grandjean - - -	108,702	Oct. 25, 1870.
Grandjean and Cassinelli	180,022	July 18, 1876.
A. M. Granger - - -	262,288	Aug. 8, 1882.
A. M. Granger - - -	263,401	Aug. 29, 1882.
Grant, Van Deyne & Pugh	84,183	Nov. 17, 1868.
W. F. Grassler - - -	374,059	Nov. 29, 1887.
J. W. Graydon - - -	203,611	May 14, 1878.
J. W. Graydon - - -	209,166	Oct. 22, 1878.
J. W. Graydon - - -	212,374	Feb. 18, 1879.
J. W. Graydon - - -	212,376	Feb. 18, 1879.
J. W. Graydon - - -	212,375	Feb. 18, 1879.
Reissued - - -	9,587	Feb. 22, 1881.
J. W. Graydon - - -	245,598	Aug. 9, 1881.
P. G. Gurnee - - -	367,711	Aug. 2, 1887.
J. R. Guy - - -	83,488	Oct. 27, 1868.
J. F. Gyles - - -	207,865	Sept. 10, 1868.
J. F. Gyles - - -	277,127	May 8, 1883.
J. F. Gyles - - -	293,962	Feb. 19, 1884.
J. L. Hadden - - -	246,610	Sept. 6, 1881.
J. S. Hagerty - - -	362,241	May 3, 1887.
E. Hambujer - - -	353,558	Nov. 30, 1886.
Hand & Reitzel - - -	230,018	July 13, 1880.
E. E. Hargreaves - - -	174,523	March 7, 1876.
Hartman & Frow - - -	372,145	Oct. 25, 1887.

PATENTEE.	NUMBER.	DATE.
S. T. Harvey -	31,716	Mar. 19, 1861.
W. B. Hayden - -	161,879	April 13, 1875.
W. H. Havens - -	274,321	Mar. 20, 1883.
M. W. Hazelton -	181,437	Aug. 22, 1876.
F. S. Heath - -	257,325	May 2, 1882.
J. Henny, Jr. - -	373,659	Nov. 22, 1887.
M. Henzey - - -	139,150	May 20, 1873.
A. W. Herr - - -	261,924	Aug. 1, 1882.
G. F. Higgins - -	373,185	Nov. 15, 1887.
E. Himrod - - -	87,846	Mar. 16, 1869.
M. T. Hitchcock -	100,404	Mar. 1, 1870.
C. Hittenger - -	289,657	Dec. 4, 1883.
Hocking & Jones -	306,615	Oct. 14, 1884.
C. Hofstetter - -	368,211	Aug. 16, 1887.
C. S. Holbrook - -	128,624	July 2, 1872.
H. C. Hood - - -	245,498	Aug. 9, 1881.
G. M. Hopkins - -	162,169	April 20, 1875.
W. L. Horne - - -	372,071	Oct. 25, 1887.
N. N. Horton - - -	227,977	May 25, 1880.
N. N. Horton - -	245,380	Aug. 9, 1881.
Hotchkiss & Pegram -	195,892	Oct. 9, 1877.
J. T. Houchens - -	242,201	May 31, 1881.
House & Bradbury -	221,733	Nov. 18, 1879.
Howard & Burden -	374,965	Dec. 20, 1887.
F. R. Hunt - - -	100,896	Mar. 15, 1870.
F. R. Hunt - - -	159,679	Feb. 9, 1875.
F. S. Hunter - - -	319,258	June 2, 1885.
M. Hurley - - -	289,265	Nov. 27, 1883.
E. O. Huntington -	191,056	May 22, 1877.
H. M. Hutchinson -	27,449	Mar. 13, 1860.
W. M. Jackson - -	203,918	May 21, 1878.
F. A. Jacob - - -	377,075	Jan. 31, 1888.
Jacobson & Bade - -	373,292	Nov. 15, 1887.
J. A. Jamieson - -	380,630	April 3, 1888.
E. S. Jenison - - -	177,847	May 23, 1876.
J. B. Johnson - -	35,612	June 17, 1862.

PATENTEE.	NUMBER.	DATE.
J. Johnson - -	245,504	Aug. 9, 1881.
J. Johnson - -	253,389	Feb. 7, 1882.
Johnson & Buerkel -	279,486	June 12, 1883.
Johnson & Buerkel -	288,708	Nov. 20, 1883.
Johnson & Buerkel -	354,640	Dec. 21, 1886.
W. S. Jones - -	140,831	July 15, 1873.
I. S. Justh - -	220,718	Oct. 21, 1879.
T. Keetch - -	189,743	April 17, 1877.
W. G. Kendrick - -	67,770	Aug. 13, 1867.
F. D. Kennedy - -	85,937	Jan. 19, 1869.
O. P. Kennedy - -	185,545	Dec. 19, 1876.
J. Kenyon - -	235,777	Dec. 21, 1880.
S. F. Kellogg - -	226,862	April 27, 1880.
G. B. Kerper - -	239,257	Mar. 22, 1881.
W. H. Kilbourn - -	188,802	Mar. 27, 1877.
F. King - -	198,027	Dec. 11, 1877.
F. King - -	210,459	Dec. 3, 1878.
F. L. Kinsman - -	241,547	May 17, 1881.
L. Kirk - -	5,325	Oct. 9, 1847.
D. M. Kirkpatrick -	256,006	April 4, 1882.
J. E. Kline - -	95,026	Sept. 21, 1869.
H. Knaub - -	378,932	Mar. 6, 1888.
Koontz, Potts & Lewis -	88,183	Mar. 23, 1869.
E. Kraschovitz - -	310,445	Jan. 6, 1885.
J. J. Lacey - -	295,255	Mar. 18, 1884.
J. J. Lacey - -	324,031	Aug. 11, 1885.
T. J. Lambert - -	308,904	Dec. 9, 1884.
Lanahan & Roberts -	367,347	July 26, 1887.
G. Laube - -	237,555	Feb. 8, 1881.
L. P. Lawrence - -	232,279	Sept. 14, 1880.
J. S. Lash - -	364,527	June 7, 1887.
C. & J. LeBosquet -	190,054	April 24, 1877.
Lemunier & Martin -	171,826	Jan. 4, 1876.
Lemunier & Gerard -	207,289	Aug. 20, 1878.
Lester and Fox - -	201,183	Mar. 12, 1878.
J. Lewis - -	372,032	Oct. 25, 1887.

PATENTEE.	NUMBER.	DATE.
Lighthall & North -	75,172	Mar. 3, 1868.
M. Limpert - -	224,194	Feb. 3, 1880.
J. S. Linsley -	186,012	Jan. 9, 1877.
J. S. Linsley - -	186,739	Jan. 30, 1877.
T. A. Long - -	363,149	May 17, 1887.
G. Leve - - -	373,898	Nov. 29, 1887.
S. Lloyd - - -	74,386	Feb. 11, 1868.
C. E. Lucas - -	191,691	June 5, 1877.
L. A. Lyon - - -	381,501	April 17, 1888.
Mabie, Whitcomb & Brown	122,326	Jan. 2, 1872.
J. H. McElroy - -	372,478	Nov. 1, 1887.
H. Maey - - -	177,858	May 23, 1876.
D. W. Magee - -	379,798	Mar. 20, 1888.
J. L. Mahan - - -	206,339	July 23, 1878.
J. Mahrenholz - -	152,566	June 30, 1874.
W. D. Mann - - -	311,021	Jan. 20, 1885.
A. J. Marshall - -	67,894	Aug. 20, 1867.
A. K. Mansfield -	235,265	Dec. 7, 1880.
W. Martin - - -	267,009	Nov. 7, 1882.
W. Martin - - -	268,917	Dec. 12, 1882.
W. Martin - - -	299,661	June 3, 1884.
W. Martin - - -	299,662	June 3, 1884.
W. Martin - - -	371,959	Oct. 25, 1887.
J. Mason - - -	271,885	Feb. 6, 1883.
E. H. May - - -	242,014	May 24, 1881.
W. J. McCoy - - -	342,527	May 25, 1886.
T. McCrossnan - -	381,806	April 24, 1888.
McDuffy & Jacques -	135,137	Jan. 21, 1873.
McGill & Knox - -	84,295	Nov. 24, 1868.
H. M. McIntire - -	214,575	April 22, 1879.
F. McManus - - -	88,055	Mar. 23, 1869.
W. S. McNeil - - -	91,148	June 8, 1869.
MacNeil & Cadwell -	81,392	Aug. 25, 1868.
Reissued - - -	3,509	June 22, 1869.
A. McWilliams - -	No number	Nov. 29, 1832.
Michaels & Broadwell -	135,239	Jan. 28, 1873.

PATENTEE.	NUMBER.	DATE.
F. A. Miller - -	178,178	May 30, 1876.
B. Milhauser - -	376,749	Jan. 24, 1888.
A. C. Minor - -	78,990	June 16, 1868.
J. Minor - - -	85,750	Jan. 12, 1869.
C. Mitchel - - -	295,576	Mar. 25, 1884.
F. M. Meddock - -	83,076	Oct. 13, 1868.
J. Megratten - -	131,769	Oct. 1, 1872.
W. Meller - - -	100,543	Mar. 8, 1870.
S. Meredith - - -	101,753	April 12, 1870.
F. E. Mertens - -	299,827	June 3, 1884.
Mooney et al. - -	143,526	Oct. 7, 1873.
A. Morel - - - -	273,758	Mar. 13, 1883.
T. N. Morse - - -	96,945	Nov. 16, 1869.
R. H. Moss - - -	193,174	July 17, 1877.
T. H. Mott - - -	141,372	July 29, 1873.
J. C. T. Mouserou	155,540	Sept. 29, 1874.
J. D. Murray - -	194,456	Aug. 21, 1877.
W. D. Nelson - - -	270,533	Jan. 9, 1883.
C. C. Newton - -	205,570	July 2, 1878.
J. Oliphant - - -	109,143	Nov. 8, 1870.
J. Oliphant - - -	163,397	May 18, 1875.
E. A. Olmstead - -	367,997	Aug. 9, 1887.
J. O. Osborne - -	186,495	Jan. 23, 1877.
R. B. Owens - - -	372,275	Oct. 25, 1887.
T. S. Page - - -	265,336	Oct. 3, 1882.
M. O. Parker - - -	378,938	Mar. 6, 1888.
W. P. Patton - - -	368,488	Aug. 16, 1887.
W. P. Patton - - -	368,489	Aug. 16, 1887.
W. Pauli - - - -	30,753	Nov. 27, 1860.
Pegram and Hotchkiss	190,780	May 15, 1877.
C. Pepper - - - -	20,021	April 20, 1858.
H. O. Peters - - -	192,083	June 19, 1877.
C. F. Pike - - - -	124,973	Mar. 26, 1872.
J. Pine - - - - -	30,347	Oct. 9, 1860.
J. Pintsch - - - -	336,585	Feb. 23, 1886.
W. B. Pope - - - -	240,267	April 19, 1881.

PATENTEE.	NUMBER.	DATE.
J. S. Post - -	147,788	Feb. 24, 1874.
J. W. Post - -	373,567	Nov. 22, 1887.
W. E. Prall - -	218,685	Aug. 19, 1879.
J. H. Prentice -	187,774	Feb. 27, 1877.
H. Purdy - -	266,311	Oct. 24, 1882.
A. Putnam - -	370,085	Sept. 20, 1887.
A. J. Pyle - -	89,340	April 27, 1869.
P. P. Quaekenboss -	208,200	Sept. 17, 1878.
P. F. Randolph -	239,671	April 5, 1881.
R. F. Rankin -	156,944	Nov. 17, 1874.
Read and Kahler -	211,261	Jan. 7, 1879.
A. Reese - -	142,867	Sept. 16, 1873.
A. Reese - -	269,324	Dec. 19, 1882.
A. Reese - -	269,325	Dec. 19, 1882.
E. H. Reynolds -	65,010	May 21, 1867.
J. Rice - -	80,505	July 28, 1868.
B. Rice - -	195,231	Sept. 18, 1877.
E. E. Ries - -	381,816	April 24, 1888.
E. E. Ries - -	381,817	April 24, 1888.
E. E. Ries - -	381,818	April 24, 1888.
E. E. Ries - -	381,819	April 24, 1888.
G. B. Riggins -	128,174	June 18, 1872.
E. Y. Robbins -	83,731	Nov. 3, 1868.
H. R. Robbins -	78,134	May 19, 1868.
H. R. Robbins -	114,349	May 2, 1871.
Reissued - -	4,922	May 28, 1872.
H. R. Robbins -	364,134	May 31, 1887.
E. L. Roberts -	81,211	Aug. 18, 1868.
Robertson and Steger -	218,316	Aug. 5, 1879.
A. M. Rodgers -	113,348	April 4, 1871.
W. W. H. Robinson -	195,049	Sept. 11, 1877.
M. C. Root - -	235,899	Dec. 28, 1880.
Root and Baker -	195,234	Sept. 18, 1877.
Ross & Brooker -	376,163	Jan. 10, 1888.
C. Rowell - -	306,864	Oct. 21, 1884.
J. and J. W. Russell -	212,403	Feb. 18, 1879.

PATENTEE.	NUMBER.	DATE.
Rumble, Symington & Strong - -	376,046	Jan. 3, 1888.
W. Stager - -	166,415	Aug. 3, 1875.
J. A. Salmon - -	210,563	Dec. 3, 1878.
J. A. Salmon - -	227,997	May 25, 1880.
Reissued - -	10,190	Aug. 29, 1882.
G. W. Samson - -	32,843	July 16, 1861.
C. Sanborn - -	92,753	July 20, 1869.
T. H. B. Sanders - -	50,960	Nov. 14, 1865.
T. H. B. Sanders - -	55,168	May 29, 1866.
E. Sanger - -	84,308	Nov. 24, 1868.
T. Saunders - -	372,989	Nov. 8, 1887.
Sax & Kear - -	79,920	July 14, 1868.
W. M. Scott - -	381,647	April 24, 1888.
J. Q. C. Searle - -	105,260	July 12, 1870.
J. Q. C. Searle - -	136,773	Mar. 11, 1873.
J. Q. C. Searle - -	236,849	Jan. 18, 1881.
J. Q. C. Searle - -	370,897	Oct. 4, 1887.
J. Q. C. Searle - -	304,867	Sept. 9, 1884.
J. Q. C. Searle - -	311,533	Feb. 3, 1885.
J. Q. C. Searle - -	311,534	Feb. 3, 1885.
J. Q. C. Searle - -	340,825	April 27, 1886.
W. T. Sears - -	340,826	April 27, 1886.
G. F. Seaver - -	380,057	Mar. 27, 1888.
B. V. Seavers - -	248,512	Oct. 18, 1881.
J. M. Segraves - -	369,743	Sept. 13, 1887.
W. G. Semple - -	246,223	Aug. 23, 1881.
D. D. & J. H. Sewall	265,284	Oct. 3, 1882.
J. H. Sewall - -	363,553	May 24, 1887.
J. H. Sewall - -	373,314	Nov. 15, 1887.
J. H. Sewall - -	374,275	Dec. 6, 1887.
J. H. Sewall - -	375,572	Dec. 27, 1887.
J. Schmitt - -	163,415	May 18, 1875.
Scripture & Stackman	142,737	Sept. 9, 1873.
J. Shackleton - -	115,533	May 30, 1871.
J. Shackleton - -	373,693	Nov. 22, 1887.

PATENTEE.	NUMBER.	DATE.
J. Shackleton - -	374,089	Nov. 29, 1887.
F. Shaler - -	100,333	Mar. 1, 1870.
I. Shirpser - -	281,801	July 24, 1883.
T. J. Simpson - -	381,589	April 24, 1888.
N. Slingland - -	284,250	Sept. 4, 1883.
C. Smith - -	86,255	Jan. 26, 1869.
C. J. Smith - -	92,115	June 29, 1869.
C. J. Smith - -	103,672	May 31, 1870.
C. J. Smith - -	200,771	Feb. 26, 1878.
W. Smith - -	201,061	March 5, 1878.
C. M. Smith - -	366,517	July 12, 1887.
E. W. Smith - -	284,682	Sept. 11, 1883.
P. Smith - -	251,741	Jan. 3, 1882.
P. Smith - -	314,735	Mar. 31, 1885.
R. H. Smith - -	369,887	Sept. 13, 1887.
Smith & Reilly - -	82,885	Oct. 6, 1868.
T. Smith - -	95,528	Oct. 5, 1869.
Smith, Weir, et al -	379,995	Mar. 27, 1888.
J. H. and S. W. Snyder	366,040	July 5, 1887.
T. S. Speakman - -	77,331	April 28, 1868.
J. Spear - -	17,756	July 7, 1857.
J. Spear - -	84,312	Nov. 24, 1868.
J. Spear - -	286,341	Oct. 9, 1883.
Specht & Fix - -	319,934	June 9, 1885.
E. Spencer - -	84,969	Dec. 15, 1868.
M. B. Stafford - -	373,494	Nov. 22, 1887.
R. Steel - -	277,626	May 15, 1883.
J. E. Steger - -	255,690	Mar. 28, 1882.
Steinhauser & Schreiner	96,498	Nov. 2, 1869.
B. D. Stevens - -	277,854	May 15, 1883.
Stewart & Bradley -	101,404	Mar. 29, 1870.
Reissued - -	3,997	May 24, 1870.
J. A. Straight - -	214,532	April 22, 1879.
L. Stockdale - -	278,456	May 29, 1883.
G. F. Stone - -	126,343	April 30, 1872.
T. F. Strong - -	32,726	July 2, 1861.

PATENTEE.	NUMBER.	DATE.
A. G. Story - -	138,822	May 13, 1873.
J. Story - -	168,426	Oct. 5, 1875.
S. and G. R. Swartz -	189,668	April 17, 1877.
H. Swindell - -	264,116	Sept. 12, 1882.
H. Tanner - -	190,929	May 15, 1877.
W. Thamm - -	147,796	Feb. 17, 1874.
J. M. Thayer - -	262,856	Aug. 15, 1882.
J. M. Thayer - -	361,380	April 19, 1887.
J. M. Thayer - -	361,469	April 19, 1887.
J. M. Thayer - -	365,030	June 14, 1887.
B. D. Thompson -	119,249	Sept. 26, 1871.
G. W. Thompson -	16,939	Mar. 31, 1857.
J. E. Thoroughgood -	311,151	Jan. 20, 1885.
A. N. Towne - -	73,477	Jan. 21, 1868.
T. Townsend - -	4 654	July 24, 1846.
F. Trowbridge - -	381,512	April 17, 1888.
L. E. Truesdell - -	380,411	April 3, 1888.
L. E. Truesdell - -	380,956	April 10, 1888.
T. W. Tyler - -	159,002	Jan. 19, 1875.
J. Tyler - -	374,020	Nov. 29, 1887.
C. Turner - -	340,258	April 20, 1886.
A. B. Vandemark -	326,809	Sept. 22, 1885.
G. Van Duzer - -	319,358	June 2, 1885.
J. M. Van Dyke - -	191,495	May 29, 1877.
W. L. Van Harlingen -	372,946	Nov. 8, 1887.
W. L. Van Harlingen,	372,947	Nov. 8, 1887.
G. Van Nostrand -	265,896	Oct. 10, 1882.
G. Van Wagenen - -	372,828	Nov. 8, 1887.
G. Van Wagenen - -	372,829	Nov. 8, 1887.
G. Van Wagenen - -	372,830	Nov. 8, 1887.
G. Van Wagenen - -	372,831	Nov. 8, 1887.
G. Van Wagenen - -	372,832	Nov. 8, 1887.
M. J. Walsh - -	263,263	Aug. 22, 1882.
M. J. Walsh - -	263,264	Aug. 22, 1882.
M. J. Walsh - -	263,266	Aug. 22, 1882.
M. J. Walsh - -	264,050	Sept. 5, 1882.

PATENTEE.	NUMBER.	DATE.
M. J. Walsh - -	269,489	Dec. 19, 1882.
M. J. Walsh - -	291,655	Jan. 8, 1884.
M. Wanner - -	374,766	Dec. 13, 1887.
W. H. Ward - -	264,913	Sept. 26, 1882.
W. H. Ward - -	264,914	Sept. 26, 1882.
J. Wardle - -	380,066	Mar. 27, 1888.
J. J. Watson - -	30,996	Dec. 18, 1860.
E. Z. Webster - -	77,786	May 12, 1868.
A. Weeks - -	85,712	Jan. 5, 1869.
A. Weeks - -	89,529	April 27, 1869.
J. H. Weiber - -	144,425	Nov. 11, 1873.
W. Wells - -	187,242	Feb. 13, 1877.
W. Wells - -	248,625	Oct. 25, 1881.
C. A. West - -	170,321	Nov. 23, 1875.
C. A. West - -	195,679	Sept. 25, 1877.
W. Westlake - -	36,044	July 29, 1862.
A. A. Wheelock - -	86,790	Feb. 9, 1869.
Reissued - -	3,328	Mar. 16, 1869.
W. W. Whitcomb - -	373,626	Nov. 2, 1887.
F. H. Whitman - -	80,525	July 28, 1868.
White & Henderson - -	257,795	May 9, 1882.
F. A. White - -	254,785	Mar. 7, 1882.
L. T. White - -	196,961	Nov. 6, 1877.
L. T. White - -	377,130	Jan. 31, 1888.
T. R. White - -	375,521	Dec. 27, 1887.
W. A. White - -	362,342	May 3, 1887.
C. F. Whorf - -	138,062	April 22, 1873.
Reissued - -	7,088	May 2, 1876.
C. W. Wiecking - -	381,490	April 17, 1888.
F. M. Wilder - -	365,715	June 28, 1887.
F. M. Wilder - -	373,039	Nov. 8, 1887.
D. Williams - -	35,053	April 22, 1862.
H. G. Wilson - -	372,779	Nov. 8, 1887.
J. Wilson - -	147,729	Feb. 17, 1874.
Wilson & Noble - -	376,463	Jan. 17, 1888.
A. P. Winslow - -	74,969	Feb. 25, 1868.

PATENTEE.		NUMBER.	DATE.
A. P. Winslow	-	85,348	Dec. 29, 1868.
A. P. Winslow	- -	293,695	Feb. 19, 1884.
J. J. Winsor	- -	201,857	Mar. 26, 1878.
T. Wiseman	- -	353,108	Nov. 23, 1886.
Wood & Scull	-	193,679	July 31, 1877.
F. Woodbridge	- -	216,010	May 27, 1879.
J. E. Wootten	-	82,672	Sept. 29, 1868.
W. H. Yeaton	- -	83,118	Oct. 13, 1868.
H. M. Young	-	358,824	Mar. 1, 1887.
H. M. Young	- -	373,575	Nov. 22, 1887.
H. M. Young	-	373,576	Nov. 22, 1887.
H. M. Young	- -	376,699	Jan. 17, 1888.
J. Zimmerman	-	309,279	Dec. 16, 1884.

CHRONOLOGICAL LIST OF PATENTS PRIOR TO MAY 1, 1888.

[Expired patent numbers are printed in bold-faced type.]

PATENTEE.	NUMBER.	DATE.
A. McWilliams	- No Number.	Nov. 29, 1832.
T. Townsend	- 4,654	July 24, 1846.
L. Kirk	- 5,325	Oct. 9, 1847.
B. T. Babbitt	- 12,306	Jan. 30, 1855.
R. Cornelius	- 14,348	Mar. 4, 1856.
G. W. Thompson	- 16,939	Mar. 31, 1857.
J. Spear	- 17,756	July 7, 1857.
C. Pepper	- 20,021	April 20, 1858.
E. B. Forbush	- 27,212	Feb. 21, 1860.
J. Pine	- 30,347	Oct. 9, 1860.
H. M. Hutchinson	- 27,449	Mar. 13, 1860.
W. Pauli	- 30,753	Nov. 27, 1860.
J. J. Watson	- 30,996	Dec. 18, 1860.
S. T. Harvey	- 31,716	Mar. 19, 1861.
T. F. Strong	- 32,726	July 2, 1861.
G. W. Samson	- 32,843	July 16, 1861.
G. K. Dearborn	- 34,280	Jan. 28, 1862.
D. Williams	- 35,053	April 22, 1862.
J. B. Johnson	- 35,612	June 17, 1862.
W. Westlake	- 36,044	July 29, 1862.
G. F. Foote	- 45,437	Nov. 29, 1864.
Samuel N. Goodale	- 47,943	May 30, 1865.
Reissued	- 4,779	Mar. 5, 1872.
T. H. B. Sanders	- 50,960	Nov. 14, 1865.
E. H. Ashcroft	- 54,662	May 15, 1866.
Reissued	- 2,917	April 14, 1868.
	6,652	Sept. 21, 1875.
	6,653	Sept. 21, 1875.
	7,967	Nov. 27, 1877.
R. Eaton	- 54,830	May 15, 1866.
H. G. Dayton	- 54,872	May 22, 1866.
T. H. B. Sanders	- 55,168	May 29, 1866.

PATENTEE.		NUMBER.	DATE.
W. C. Baker -	-	58,755	Oct. 16, 1866.
J. Gibson -	-	60,714	Jan. 1, 1867.
Reissued -	-	3,029	July 14, 1868.
C. C. Converse -	-	62,254	Feb. 19, 1867.
Reissued -	-	7,506	Feb. 13, 1877.
E. H. Reynolds -	-	65,010	May 21, 1867.
W. G. Kendrick -	-	67,770	Aug. 13, 1867.
A. J. Marshall -	-	67,894	Aug. 20, 1867.
Allen & Campbell -	-	70,495	Nov. 5, 1867.
W. C. Baker -	-	71,948	Dec. 10, 1867.
C. R. Abbott -	-	72,258	Dec. 17, 1867.
A. N. Towne -	-	73,477	Jan. 21, 1868.
R. A. Cheseborough -	-	73,781	Jan. 28, 1868.
S. Lloyd -	-	74,386	Feb. 11, 1868.
D. N. Dotterer -	-	74,899	Feb. 25, 1868.
A. P. Winslow -	-	74,969	Feb. 25, 1868.
Lighthall & North -	-	75,172	Mar. 3, 1868.
W. C. Baker -	-	75,345	Mar. 10, 1868.
G. W. Eddy -	-	76,175	Mar. 31, 1868.
S. W. Francis -	-	77,270	April 28, 1868.
T. S. Speakman -	-	77,331	April 28, 1868.
E. Z. Webster -	-	77,786	May 12, 1868.
A. C. Crary -	-	77,871	May 12, 1868.
J. Dripps -	-	78,074	May 19, 1868.
H. R. Robbins -	-	78,134	May 19, 1868.
R. O. Brien -	-	78,475	June 2, 1868.
A. C. Miner -	-	78,990	June 16, 1868.
S. Darling -	-	79,449	June 30, 1868.
Sax & Kear -	-	79,920	July 14, 1868.
M. J. Clark -	-	80,393	July 28, 1868.
J. Rice -	-	80,505	July 28, 1868.
F. H. Whitman -	-	80,525	July 28, 1868.
S. L. Denny -	-	80,927	July 30, 1868.
C. Carpenter -	-	81,137	Aug. 18, 1868.
E. L. Roberts -	-	81,211	Aug. 18, 1868.
I. R. Amsden -	-	81,322	Aug. 25, 1868.

PATENTEE.	NUMBER.	DATE.
McNeil & Cadwell -	81,392	Aug. 25, 1868.
Reissued - -	3,509	June 22, 1869.
S. Ainsworth -	81,572	Sept. 1, 1868.
H. M. Britton -	81,873	Sept. 8, 1868.
W. B. Farwell -	82,210	Nov. 15, 1868.
W. A. Allen -	82,373	Sept. 22, 1868.
J. E. Wooten -	82,672	Sept. 29, 1868.
J. Dripps -	82,810	Oct. 6, 1868.
Smith & Reilly -	82,885	Oct. 6, 1868.
F. M. Meddock -	83,076	Oct. 13, 1868.
W. H. Yeaton -	83,118	Oct. 13, 1868.
J. C. Eckert -	83,142	Oct. 20, 1868.
J. R. Guy -	83,448	Oct. 27, 1868.
E. Y. Robbins -	83,731	Nov. 3, 1868.
Grant, Van Deyne & Pugh	84,183	Nov. 17, 1868.
McGill & Knox -	84,295	Nov. 24, 1868.
E. Sanger -	84,308	Nov. 24, 1868.
J. Spear -	84,312	Nov. 24, 1868.
A. Davidsohn -	84,375	Dec. 8, 1868.
A. J. Gibson -	84,740	Dec. 8, 1868.
E. Spencer -	84,969	Dec. 15, 1868.
A. P. Winslow -	85,348	Dec. 29, 1868.
G. A. Fullerton -	85,377	Dec. 29, 1868.
M. S. Bolt -	85,559	Jan. 5, 1869.
A. Weeks -	85,712	Jan. 9, 1869.
J. Minor -	85,750	Jan. 12, 1869.
F. D. Kennedy -	85,937	Jan. 19, 1869.
C. Smith -	86,255	Jan. 26, 1869.
A. A. Wheelock -	86,790	Feb. 9, 1869.
Reissued - -	3,328	Mar. 16, 1869.
A. C. Crary -	87,472	Mar. 2, 1869.
W. H. Beal -	87,532	Mar. 9, 1869.
E. Himrod -	87,846	Mar. 16, 1869.
F. McManus -	88,055	Mar. 23, 1869.
Koontz, Potts & Lewis -	88,183	Mar. 23, 1869.

PATENTEE.	NUMBER.	DATE.
A. C. Crary - -	88,852	April 13, 1869.
L. R. Comstock - -	89,027	April 20, 1869.
A. J. Pyle - -	89,340	April 27, 1869.
A. Weeks - -	89,529	April 27, 1869.
W. S. McNeil - -	91,148	June 8, 1869.
A. C. Crary - -	91,524	June 22, 1869.
D. C. Chipman - -	91,824	June 29, 1869.
C. J. Smith - -	92,115	June 29, 1869.
C. Sanborn - -	92,753	July 20, 1869.
J. E. Kline - -	95,026	Sept. 21, 1869.
T. Smith - -	95,528	Oct. 5, 1869.
Steinhauser & Shreiner	96,498	Nov. 2, 1869.
T. N. Morse - -	96,945	Nov. 16, 1869.
J. Gibson - -	98,248	Dec. 28, 1869.
F. Shaler - -	100,333	Mar. 1, 1870.
M. T. Hitchcock - -	100,404	Mar. 1, 1870.
W. Meller - -	100,543	Mar. 8, 1870.
F. R. Hunt - -	100,896	Mar. 15, 1870.
Stewart & Bradley - -	101,404	Mar. 29, 1870.
Reissued - -	3,997	May 24, 1870.
S. Meredith - -	101,753	April 12, 1870.
G. Beeman - -	102,080	April 19, 1870.
C. J. Smith - -	103,672	May 31, 1870.
Brase & Salladay - -	103,839	June 7, 1870.
J. Q. C. Searle - -	105,260	July 12, 1870.
J. M. Comins - -	106,124	Aug. 9, 1870.
J. G. Allen - -	107,149	Sept. 6, 1870.
P. Grandjean - -	108,702	Oct. 25, 1870.
J. Oliphant - -	109,143	Nov. 8, 1870.
A. M. Rodgers - -	113,348	April 4, 1871.
H. R. Robbins - -	114,349	May 2, 1871.
Reissued - -	4,922	May 28, 1872.
J. Shackleton - -	115,533	May 30, 1871.
J. G. Allen - -	116,914	July 11, 1871.
J. T. Even - -	117,059	July 18, 1871.
B. D. Thompson - -	119,249	Sept. 26, 1871.

PATENTEE.	NUMBER.	DATE.
Mabie, Whitcomb & Brown - -	122,326	Jan. 2, 1872.
S. N. Goodale - -	123,875	Feb. 20, 1877.
C. F. Pike - -	124,973	Mar. 26, 1872.
G. F. Stone - -	126,343	April 30, 1872.
T. B. Atterbury - -	127,945	June 18, 1872.
Bradley & Fulghum - -	128,103	June 18, 1872.
G. B. Riggins - -	128,174	June 18, 1872.
C. L. Holbrook - -	128,624	July 2, 1872.
J. Megratten - -	131,769	Oct. 1, 1872.
McDuffy & Jacques - -	135,137	Jan. 21, 1873.
Michaels & Broadwell	135,239	Jan. 28, 1873.
J. Q. C. Searle - -	136,773	Mar. 11, 1873.
C. F. Whorf - -	138,062	April 22, 1873.
Reissued - -	7,088	May 2, 1876.
A. G. Storey - -	138,822	May 13, 1873.
M. Hensey - -	139,150	May 20, 1873.
W. S. Jones - -	104,831	July 15, 1873.
T. H. Mott - -	141,372	July 29, 1873.
Scripture & Stackman	142,737	Sept. 9, 1873.
A. Reese - -	142,867	Sept. 16, 1873.
Mooney, <i>et al.</i> - -	143,526	Oct. 7, 1873.
Berghauser & Kiesling - -	144,183	Nov. 4, 1873.
J. H. Weibee - -	144,425	Nov. 11, 1873.
J. Dahmer - -	146,990	Feb. 3, 1874.
W. L. Drake - -	147,248	Feb. 10, 1874.
W. Thamm - -	147,706	Feb. 17, 1874.
J. Wilson - -	147,729	Feb. 17, 1874.
J. S. Post - -	147,788	Feb. 24, 1874.
W. S. Deeds - -	147,829	Feb. 24, 1874.
W. M. Fuller - -	148,440	Mar. 10, 1874.
W. S. Deeds - -	149,842	April 21, 1874.
S. Mahrenholz - -	152,566	June 30, 1874.
E. Densmore - -	152,615	June 30, 1874.
J. C. T. Mousseron - -	155,540	Sept. 29, 1874.
R. F. Rankin - -	156,944	Nov. 17, 1874.

PATENTEE.		NUMBER.	DATE.
T. W. Tyler	-	159,002	Jan. 19, 1875.
F. & J. Chalfant	-	159,541	Feb. 9, 1875.
F. R. Hunt	- -	159,679	Feb. 9, 1875.
T. B. Field	- - -	161,108	Mar. 23, 1875.
W. B. Hayden	-	161,879	April 13, 1875.
G. M. Hopkins	- -	162,169	April 20, 1875.
J. Oliphant	- -	163,397	May 18, 1875.
J. Schmitt	- - -	163,451	May 18, 1875.
J. Amory	- -	163,908	June 1, 1875.
W. Sager	- - -	166,451	Aug. 3, 1875.
J. Story	- -	168,426	Oct. 5, 1875.
C. A. West	- - -	170,321	Nov. 23, 1875.
Lemunier & Martin	-	171,826	Jan. 4, 1876.
E. E. Hargreaves	-	174,523	Mar. 7, 1876.
E. S. Jenison	-	177,847	May 23, 1876.
H. Maey	- -	177,858	May 23, 1876.
F. A. Miller	- -	178,178	May 30, 1876.
Grandjean & Cassinelli	-	180,022	July 18, 1876.
M. W. Hazelton	-	181,437	Aug. 22, 1876.
H. A. Gouge	- -	184,858	Nov. 26, 1876.
J. C. Bates	-	185,474	Dec. 19, 1876.
O. P. Kennedy	- -	185,545	Dec. 19, 1876.
J. S. Linsley	-	186,012	Jan. 9, 1877.
J. O. Osborne	- -	186,495	Jan. 23, 1877.
J. S. Linsley	-	186,739	Jan. 30, 1877.
W. Wells	- -	187,242	Feb. 13, 1877.
J. H. Prentice	-	187,774	Feb. 27, 1877.
R. Hall	- - -	188,127	Mar. 6, 1877.
W. H. Kilbourn	-	188,802	Mar. 27, 1877.
G. W. Dinsman	- -	189,086	April 3, 1877.
S. & G. R. Swartz	-	189,668	April 17, 1877.
T. Keetch	- -	189,743	April 17, 1877.
L. Capron	- -	190,002	April 24, 1877.
G. & J. LeBosquet	-	190,054	April 24, 1877.
Pegram & Hotchkiss	-	190,780	May 15, 1877.
H. Tanner	- -	190,929	May 15, 1877.

PATENTEE.		NUMBER.	DATE.
E. O. Huntington	-	191,056	May 22, 1877.
J. M. Van Dyke	-	191,495	May 29, 1877.
C. E. Lucas	-	191,691	June 5, 1877.
A. C. Goodell	-	192,067	June 19, 1877.
H. O. Peters	-	192,083	June 19, 1877.
R. H. Moss	-	193,174	July 17, 1877.
Wood & Scull	-	193,679	July 31, 1877.
D. C. Chipman	-	194,331	Aug. 21, 1877.
U. J. Duffield	-	194,418	Aug. 21, 1877.
J. D. Murray	-	194,456	Aug. 21, 1877.
W. W. H. Robinson	-	195,049	Sept. 11, 1877.
B. Rice	-	195,231	Sept. 18, 1877.
Root & Baker	-	195,234	Sept. 18, 1877.
C. A. West	-	195,679	Sept. 25, 1877.
J. F. Callaway	-	195,792	Oct. 2, 1877.
Hotchkiss & Pegram		195,892	Oct. 9, 1877.
L. T. White	-	196,961	Nov. 6, 1877.
F. King	-	198,027	Dec. 11, 1877.
F. C. Conley	-	199,414	Jan. 22, 1878.
W. F. Condon	-	200,697	Feb. 26, 1878.
C. J. Smith	-	200,771	Feb. 26, 1878.
W. Smith	-	201,061	Mar. 5, 1878.
Lester & Fox	-	201,183	Mar. 12, 1878.
J. J. Winsor	-	201,857	Mar. 26, 1878.
J. W. Graydon	-	203,611	May 14, 1878.
W. M. Jackson	-	203,918	May 21, 1878.
T. T. Farnsworth	-	205,069	June 18, 1878.
F. S. Bissell	-	205,467	July 2, 1878.
F. S. Bissell	-	205,468	July 2, 1878.
C. C. Newton	-	205,570	July 2, 1878.
J. L. Mahan	-	206,339	July 23, 1878.
Lemunier & Gerard	-	207,289	Aug. 20, 1878.
A. S. Brownell	-	207,588	Sept. 3, 1878.
J. F. Gyles	-	207,865	Sept. 10, 1878.
F. E. Ensign	-	208,013	Sept. 17, 1878.
P. P. Quackenboss	-	208,200	Sept. 17, 1878.

PATENTEE.		NUMBER.	DATE.
J. W. Graydon	-	209,166	Oct. 22, 1878.
W. C. Baker	- -	209,793	Nov. 12, 1878.
F. King	- -	210,459	Dec. 3, 1878.
J. A. Salmon	- -	210,563	Dec. 3, 1878.
E. L. Brady	- -	210,910	Dec. 17, 1878.
W. F. Condon	- -	210,918	Dec. 17, 1878.
E. M. Berment	-	211,214	Jan. 7, 1879.
Read & Kahler	- -	211,261	Jan. 7, 1879.
G. C. Bovey	- -	211,963	Feb. 4, 1879.
J. W. Graydon	- -	212,374	Feb. 18, 1879.
J. W. Graydon	-	212,375	Feb. 18, 1879.
Reissued	- -	9,587	Feb. 22, 1881.
J. W. Graydon	-	212,376	Feb. 18, 1879.
J. & J. W. Russell	-	212,403	Feb. 18, 1879.
J. A. Straight	-	214,532	April 22, 1879.
H. M. McIntire	- -	214,575	April 22, 1879.
W. D. DeRusk	-	215,335	May 13, 1879.
F. Woodbridge	- -	216,010	May 27, 1879.
Robertson & Steger	-	218,316	Aug. 5, 1879.
W. E. Prall	- -	218,685	Aug. 19, 1879.
G. A. Badger	-	219,898	Sept. 23, 1879.
J. S. Justh	- -	220,718	Oct. 21, 1879.
J. E. Chapin	-	221,153	Nov. 4, 1879.
J. E. Chapin	- -	221,154	Nov. 4, 1879.
House & Bradbury	-	221,733	Nov. 18, 1879.
J. B. Collin	- -	222,246	Dec. 2, 1879.
M. Limbert	- -	224,194	Feb. 3, 1880.
J. Berg	- -	226,220	April 6, 1880.
S. F. Kellogg	-	226,862	April 27, 1880.
G. C. Bovey	- -	227,345	May 11, 1880.
N. N. Horton	-	227,977	May 25, 1880.
J. A. Salmon	- -	227,997	May 25, 1880.
Reissued	- -	10,190	Aug. 29, 1882.
J. Berg	- -	229,854	July 13, 1880.
Hand & Reitzel	-	230,018	July 13, 1880.
L. P. Lawrence	- -	232,279	Sept. 14, 1880.

PATENTEE.		NUMBER.	DATE
H. A. Gouge	-	234,666	Nov. 23, 1880.
A. K. Mansfield	-	235,265	Dec. 7, 1880.
J. Kenyon	-	235,777	Dec. 21, 1880.
J. Berg	-	235,847	Dec. 28, 1880.
M. C. Root	-	235,899	Dec. 28, 1880.
J. Q. C. Searle	-	236,849	Jan. 18, 1881.
G. W. Baird	-	237,233	Feb. 1, 1881.
G. Laube	-	237,555	Feb. 8, 1881.
G. B. Kerper	-	239,257	Mar. 22, 1881.
P. F. Randolph	-	239,671	April 5, 1881.
W. B. Pope	-	240,267	April 19, 1881.
F. L. Kinsman	-	241,547	May 17, 1881.
E. H. May	-	242,014	May 24, 1881.
J. T. Houchens	-	242,201	May 31, 1881.
E. E. Gold	-	242,299	May 31, 1881.
W. C. Baker	-	244,108	July 12, 1881.
W. C. Baker	-	244,522	July 19, 1881.
E. Baker	-	244,785	July 26, 1881.
N. N. Horton	-	245,380	Aug. 9, 1881.
H. C. Hood	-	245,498	Aug. 9, 1881.
J. Johnson	-	245,504	Aug. 9, 1881.
J. W. Graydon	-	245,598	Aug. 9, 1881.
W. G. Semple	-	246,223	Aug. 23, 1881.
J. L. Hadden	-	246,610	Sept. 6, 1881.
Eastman, Kimball & Murch		247,028	Sept. 13, 1881.
B. V. Seevers	-	248,512	Oct. 18, 1881.
W. Wells	-	248,625	Oct. 25, 1881.
Eastman, Kimball & Murch		248,924	Nov. 1, 1881.
W. F. Condon	-	250,502	Dec. 6, 1881.
P. Smith	-	251,741	Jan. 3, 1882.
M. D. Fitzgerald	-	252,752	Jan. 24, 1882.
W. C. Baker	-	253,253	Feb. 7, 1882.
J. Johnson	-	253,389	Feb. 7, 1882.
W. E. Eastman	-	253,521	Feb. 14, 1882.
E. E. Gold	-	253,693	Feb. 14, 1882.
F. A. White	-	254,785	Mar. 7, 1882.

PATENTEE	NUMBER.	DATE.
J. E. Steger - -	255,690	Mar. 28, 1882.
D. M. Kirkpatrick -	256,006	April 4, 1882.
F. S. Heath - -	257,325	May 2, 1882.
White & Henderson -	257,795	May 9, 1882.
Ewins & Wisewell -	258,394	May 23, 1882.
W. H. Baldwin - -	258,542	May 30, 1882.
R. C. Blackall - -	259,463	June 13, 1882.
B. Chamberlain - -	259,976	June 20, 1882.
A. W. Herr - - -	261,924	Aug. 1, 1882.
A. M. Granger - -	262,288	Aug. 8, 1882.
J. M. Thayer - - -	262,856	Aug. 15, 1882.
W. F. Condon - - -	263,118	Aug. 22, 1882.
M. J. Walsh - - -	263,263	Aug. 22, 1882.
M. J. Walsh - - -	263,264	Aug. 22, 1882.
M. J. Walsh - - -	263,266	Aug. 22, 1882.
A. M. Granger - -	263,401	Aug. 29, 1882.
M. J. Walsh - - -	264,050	Sept. 5, 1882.
H. Swindell - - -	264,116	Sept. 12, 1882.
W. H. Ward - - -	264,913	Sept. 26, 1882.
W. H. Ward - - -	264,914	Sept. 26, 1882.
D. D. & J. H. Sewell -	265,284	Oct. 3, 1882.
T. S. Page - - -	265,336	Oct. 3, 1882.
G. Van Nostrand - -	265,896	Oct. 10, 1882.
H. Purdy - - - -	266,311	Oct. 24, 1882.
G. M. Edwards - - -	266,794	Oct. 31, 1882.
W. Martin - - - -	267,009	Nov. 7, 1882.
Brockway & Watts -	267,667	Nov. 21, 1882.
W. Martin - - - -	268,917	Dec. 12, 1882.
W. E. Eastman - - -	269,189	Dec. 19, 1882.
A. Reese - - - -	269,324	Dec. 19, 1882.
A. Reese - - - -	269,325	Dec. 19, 1882.
M. J. Walsh - - -	269,489	Dec. 19, 1882.
R. G. S. Collamore -	269,637	Dec. 22, 1882.
W. D. Nelson - - -	270,553	Jan. 9, 1883.
J. Mason - - - -	271,885	Feb. 6, 1883.
A. Morel - - - -	273,758	Mar. 13, 1883.

PATENTEE.	NUMBER.	DATE.
W. H. Havens - -	274,321	Mar. 20, 1883.
W. M. Fuller - -	274,753	Mar. 27, 1883.
J. F. Gyles - -	277,127	May 8, 1883.
W. F. Condon - -	277,546	May 15, 1883.
R. Steel - - -	277,626	May 15, 1883.
B. D. Stevens - -	277,854	May 15, 1883.
L. Stockdale - -	278,466	May 29, 1883.
Johnson & Buerkel -	279,486	June 12, 1883.
I. Shirpser - -	281,081	July 24, 1883.
N. Slingland - -	284,250	Sept. 4, 1883.
E. W. Smith - -	284,682	Sept. 11, 1883.
J. Spear - - -	286,341	Oct. 9, 1883.
Fife & Pickenpaugh -	287,268	Oct. 23, 1883.
Johnson & Buerkel -	288,708	Nov. 20, 1883.
M. Hurly - - -	289,265	Nov. 27, 1883.
C. Hittenger - -	289,657	Dec. 4, 1883.
M. J. Walsh - - -	291,655	Jan. 8, 1884.
A. P. Winslow - -	293,695	Feb. 19, 1884.
J. F. Gyles - - -	293,962	Feb. 19, 1884.
J. J. Lacey - - -	295,255	Mar. 18, 1884.
C. Mitchell - - -	295,576	Mar. 25, 1884.
W. Martin - - -	299,661	June 3, 1884.
W. Martin - - -	299,662	June 3, 1884.
F. E. Mertens - -	299,827	June 3, 1884.
J. F. Gibson - - -	301,713	July 8, 1884.
R. H. Brown - - -	302,707	July 29, 1884.
J. A. Forbes - - -	303,566	Aug. 12, 1884.
J. Q. C. Searle - -	304,867	Sept. 9, 1884.
Hocking & Jones - -	306,615	Oct. 14, 1884.
C. Rowell - - -	306,864	Oct. 21, 1884.
T. J. Lambert - - -	308,904	Dec. 9, 1884.
J. Zimmerman - -	309,279	Dec. 16, 1884.
E. E. Gold - - -	309,299	Dec. 16, 1884.
E. Kraschovitz - -	310,445	Jan. 6, 1885.
W. D. Mann - - -	311,021	Jan. 20, 1885.
J. E. Thoroughgood -	311,151	Jan. 20, 1885.

PATENTEE.		NUMBER.	DATE.
J. Q. C. Searle	-	311,533	Feb. 3, 1885.
J. Q. C. Searle	- -	311,534	Feb. 3, 1885.
J. Emerson	- -	314,006	Mar. 17, 1885.
J. Emerson	- -	314,007	Mar. 17, 1885.
P. Smith	- -	314,735	Mar. 31, 1885.
F. S. Hunter	- -	319,258	June 2, 1885.
G. Van Duzer	-	319,358	June 2, 1885.
Sprecht & Fix	- -	319,934	June 9, 1885.
J. J. Lacey	- -	324,031	Aug. 11, 1885.
H. E. Freese	- -	325,796	Sept. 8, 1885.
A. B. Vandemark	-	326,809	Sept. 22, 1885.
E. D. Cody	- -	329,017	Oct. 27, 1885.
W. C. Baker	- -	331,367	Dec. 1, 1885.
J. A. Faust	- -	336,221	Feb. 16, 1886.
J. Pintsch	- -	336,585	Feb. 23, 1886.
C. Turner	- -	340,258	April 20, 1886.
J. Q. C. Searle	-	340,825	April 27, 1886.
W. T. Sears	- -	340,826	April 27, 1886.
W. J. McCoy	-	342,527	May 25, 1886.
W. C. Dunn	- -	343,445	June 8, 1886.
J. J. Flynn	- -	344,645	June 29, 1886.
J. R. Drodzewski	-	348 664	Sept. 8, 1886.
E. E. Gold	- -	349,991	Sept. 28, 1886.
T. Wiseman	- -	353,108	Nov. 23, 1886.
E. Hamburger	-	353,558	Nov. 30, 1886.
Johnson & Buerkel	-	354,640	Dec. 21, 1886.
W. C. Baker	-	353,839	Dec. 7, 1886.
A. R. Chisholm	- -	358,824	Feb. 22, 1887.
H. M. Young	- -	358,824	Mar. 1, 1887.
W. C. Dunn	- -	359,206	Mar. 8, 1887.
J. M. Thayer	- -	361,380	April 19, 1887.
J. M. Thayer	- -	361,469	April 19, 1887.
J. S. Hagerty	-	362,214	May 3, 1887.
W. A. White	- -	362,342	May 3, 1887.
J. L. Brink	- -	362,928	May 17, 1887.
T. A. Long	- -	363,149	May 17, 1887.

PATENTEE.		NUMBER.	DATE.
J. R. Drodzewski	-	363,374	May 24, 1887.
J. H. Sewall	-	364,553	May 24, 1887.
H. R. Robbins	-	364,134	May 31, 1887.
J. S. Lash	-	364,527	June 7, 1887.
O. Bryan	-	364,799	June 14, 1887.
J. N. Thayer	-	365,030	June 14, 1887.
S. P. Canfield	-	365,237	June 21, 1887.
F. M. Wilder	-	365,715	June 28, 1887.
H. P. Cope	-	365,730	June 27, 1887.
W. E. Depp	-	365,975	July 5, 1887.
W. C. Dunn	-	365,977	July 5, 1887.
J. H. & S. W. Snyder		366,040	July 5, 1887.
J. W. Fowler	-	366,087	July 5, 1887.
J. H. Ballard	-	366,445	July 12, 1887.
C. M. Smith	-	366,517	July 12, 1887.
J. S. Case	-	366,761	July 19, 1887.
Lanahan & Roberts	-	367,347	July 26, 1887.
J. L. Bangley	-	367,393	Aug. 2, 1887.
P. J. Gurnee	-	367,711	Aug. 2, 1887.
E. A. Olmstead	-	367,997	Aug. 9, 1887.
C. Hofstetter	-	368,211	Aug. 16, 1887.
W. P. Patton	-	368,488	Aug. 16, 1887.
W. P. Patton	-	368,489	Aug. 16, 1887.
G. H. Benjamin	-	368,906	Aug. 23, 1887.
J. M. Segraves	-	369,743	Sept. 13, 1887.
R. H. Smith	-	369,887	Sept. 13, 1887.
M. B. Derrick	-	370,049	Sept. 20, 1887.
A. Putnam	-	370,085	Sept. 20, 1887.
J. H. Chambers	-	370,606	Sept. 27, 1887.
W. Brown	-	370,853	Oct. 4, 1887.
J. Q. C. Searle	-	370,897	Oct. 4, 1887.
B. Goldsmith	-	371,059	Oct. 4, 1887.
H. C. Dennis	-	371,178	Oct. 11, 1887.
P. Defresne	-	371,558	Oct. 18, 1887.
W. Martin	-	371,959	Oct. 25, 1887.
J. Lewis	-	372,032	Oct. 25, 1887.

PATENTEE.	NUMBER.	DATE.
R. Coddington - -	372,061	Oct. 25, 1887.
W. L. Horne - -	372,071	Oct. 25, 1887.
Hartman & Frow -	372,145	Oct. 25, 1887.
R. B. Owen - -	372,275	Oct. 25, 1887.
B. R. Deacon - -	372,363	Nov. 1, 1887.
J. Emerson - -	372,303	Nov. 1, 1887.
J. H. MacEl'Rey -	372,478	Nov. 1, 1887.
S. A. Darrach - -	372,605	Nov. 1, 1887.
H. G. Wilson - -	372,779	Nov. 8, 1887.
G. Van Wagenen -	372,828	Nov. 8, 1887.
G. Van Wagenen -	372,829	Nov. 8, 1887.
G. Van Wagenen -	372,820	Nov. 8, 1887.
G. Van Wagenen -	372,831	Nov. 8, 1887.
G. Van Wagenen -	372,832	Nov. 8, 1887.
W. L. Van Harlingen -	372,946	Nov. 8, 1887.
W. L. Van Harlingen	372,947	Nov. 8, 1887.
T. Saunders - -	372,989	Nov. 8, 1887.
F. M. Wilder - -	373,039	Nov. 8, 1887.
G. F. Higgins - -	373,185	Nov. 15, 1887.
Jacobson & Bade -	373,292	Nov. 15, 1887.
J. H. Sewall - -	373,314	Nov. 15, 1887.
M. B. Stafford - -	373,495	Nov. 22, 1887.
J. W. Post - -	373,567	Nov. 22, 1887.
H. M. Young - -	373,575	Nov. 22, 1887.
H. M. Young - -	373,576	Nov. 22, 1887.
W. W. Whitcomb -	373,626	Nov. 22, 1887.
J. Henney, Jr. - -	373,659	Nov. 22, 1887.
J. Shackleton - -	373,693	Nov. 22, 1887.
G. W. Glass - -	373,732	Nov. 22, 1887.
G. Love - -	373,898	Nov. 29, 1887.
J. Tyler - -	374,020	Nov. 29, 1887.
W. F. Grassler - -	374,059	Nov. 29, 1887.
J. Shackleton - -	374,089	Nov. 29, 1887.
S. H. Barrett - -	374,169	Dec. 6, 1887.
J. H. Sewall - -	374,275	Dec. 6, 1887.
W. C. Baker - -	374,336	Dec. 6, 1887.

PATENTEE.		NUMBER.	DATE.
F. G. Botsford	-	374,447	Dec. 6, 1887.
L. K. Curlett	- -	374,659	Dec. 13, 1887.
M. Wanner	- -	374,766	Dec. 13, 1887.
Howard & Burden	-	374,965	Dec. 20, 1887.
T. R. White	- -	375,521	Dec. 27, 1887.
G. Gibbs	- -	375,547	Dec. 27, 1887.
J. H. Sewall	- -	375,572	Dec. 27, 1887.
W. Flanigan	- -	375,738	Jan. 3, 1888.
Rumble, Symington & Strong	- -	376,046	Jan. 3, 1888.
G. H. Benjamin	-	376,061	Jan. 10, 1888.
N. Curtis	- -	376,075	Jan. 10, 1888.
Casselman & McGann		376,138	Jan. 10, 1888.
Ross & Brooker	- -	376,163	Jan. 10, 1888.
W. H. Durant	-	376,239	Jan. 10, 1888.
R. M. Bache	- -	376,275	Jan. 10, 1888.
Wilson & Noble	-	376,463	Jan. 17, 1888.
H. M. Young	- -	376,699	Jan. 17, 1888.
B. Millhauser	-	376,749	Jan. 24, 1888.
C. Bassini	- -	377,057	Jan. 31, 1888.
J. R. Drodzewski	-	377,065	Jan. 31, 1888.
F. A. Jacob	- -	377,075	Jan. 31, 1888.
L. T. White	- -	377,130	Jan. 31, 1888.
Gilbert & Long	- -	377,934	Feb. 14, 1888.
J. Briscoe	-	378,284	Feb. 21, 1888.
H. Knaub	- -	378,932	Mar. 6, 1888.
M. O. Parker	-	378,938	Mar. 6, 1888.
D. Connell	- -	379,101	Mar. 6, 1888.
P. M. Askren	-	379,628	Mar. 20, 1888.
R. M. Dixon	- -	379,691	Mar. 20, 1888.
D. W. Magee	-	379,798	Mar. 20, 1888.
H. Fenton	- -	379,947	Mar. 27, 1888.
Smith, Weir et al.	-	379,995	Mar. 27, 1888.
G. F. Seever	- -	380,057	Mar. 27, 1888.
J. Wardle	- -	380,066	Mar. 27, 1888.
F. J. Crouch	- -	380,247	Mar. 27, 1888.

PATENTEE.		NUMBER.	DATE.
L. E. Treusdell	-	380,411	April 3, 1888.
W. C. Baker	-	380,544	April 3, 1888.
J. A. Jamieson	-	380,630	April 3, 1888.
L. E. Treusdell	-	380,956	April 10, 1888.
C. W. Wiecking	-	381,490	April 17, 1888.
L. A. Lyon	-	381,501	April 17, 1888.
F. Trowbridge	-	381,512	April 17, 1888.
T. J. Simpson	-	381,589	April 24, 1888.
W. M. Scott	-	381,754	April 24, 1888.
E. B. Benham	-	381,754	April 24, 1888.
T. McCrossnan	-	381,806	April 24, 1888.
E. E. Ries	-	381,816	April 24, 1888.
E. E. Ries	-	381,817	April 24, 1888.
E. E. Ries	-	381,818	April 24, 1888.
E. E. Ries	-	381,819	April 24, 1888.

INDEPENDENT HEATERS INSIDE THE CAR.

HOT AIR.

[Expired patent numbers are printed in bold-faced type.]

PATENTEE.	NUMBER.	DATE.
B. T. Babbitt - -	12,306	Jan. 30, 1855.
J. Spear - -	17,756	July 7, 1857.
G. W. Thompson - -	16,939	Mar. 31, 1857.
C. Pepper - -	20,021	April 20, 1858.
E. B. Forbush - -	27,212	Feb. 21, 1860.
T. F. Strong - -	32,726	July 2, 1861.
J. B. Johnson - -	35,612	June 17, 1862.
G. F. Foote - -	45,437	Nov. 29, 1864.
T. H. B. Sanders - -	50,960	Nov. 14, 1865.
R. Eaton - -	54,830	May 15, 1866.
H. G. Dayton - -	54,872	May 22, 1866.
T. H. B. Sanders - -	55,168	May 29, 1866.
Allen & Campbell - -	70,495	Nov. 5, 1867.
J. Gibson - -	60,714	Jan. 1, 1867.
Reissued - -	3,029	July 14, 1868.
A. N. Towne - -	73,477	Jan. 21, 1868.
A. P. Winslow - -	74,969	Feb. 25, 1868.
J. Dripps - -	78,074	May 19, 1868.
R. O. Brien - -	78,475	June 2, 1868.
S. Darling - -	79,449	June 30, 1868.
Sax & Kear - -	79,920	July 14, 1868.
F. H. Whitman - -	80,525	July 28, 1868.
M. J. Clark - -	80,393	July 28, 1868.
S. L. Denny - -	80,927	July 30, 1868.
McNeil & Cadwell - -	81,392	Aug. 25, 1868.
Reissued - -	3,509	June 22, 1869.
J. C. Eckert - -	83,142	Oct. 20, 1868.
W. A. Allen - -	82,373	Sept. 22, 1868.
J. Dripps - -	82,810	Oct. 6, 1868.
Grant, Van Deyne & Pugh	84,183	Nov. 17, 1868.

PATENTEE.	NUMBER.	DATE.
McGill & Knox - -	84,295	Nov. 24, 1868.
E. Sanger - -	84,308	Nov. 24, 1868.
J. Spear - -	84,312	Nov. 24, 1868.
A. J. Gibson - -	84,740	Dec. 8, 1868.
A. P. Winslow - -	85,348	Dec. 29, 1868.
J. Minor - -	85,750	Jan. 12, 1869.
F. D. Kennedy - -	85,937	Jan. 19, 1869.
C. Smith - -	86,255	Jan. 26, 1869.
A. A. Wheelock - -	86,790	Feb. 9, 1869.
Reissued - -	3,328	Mar. 16, 1869.
E. Himrod - -	87,846	Mar. 16, 1869.
Koontz, Potts & Lewis	88,183	Mar. 23, 1869.
L. R. Comstock - -	89,027	April 20, 1869.
A. J. Pyle - -	89,340	April 27, 1869.
W. S. McNeil - -	91,148	June 8, 1869.
C. J. Smith - -	92,115	June 29, 1869.
C. Sanborn - -	92,753	July 20, 1869.
Steinhauser & Shreiner	96,498	Nov. 2, 1869.
W. Meller - -	100,543	Mar. 8, 1870.
M. T. Hitchcock - -	100,404	Mar. 1, 1870.
S. Meredith - -	101,753	April 12, 1870.
G. Beeman - -	102,080	April 19, 1870.
Stewart & Bradley - -	101,404	Mar. 29, 1870.
Reissued - -	3,997	May 24, 1870.
C. J. Smith - -	103,672	May 31, 1870.
Brace & Salladay - -	103,839	June 7, 1870.
J. Q. C. Searle - -	105,260	July 12, 1870.
J. M. Comins - -	106,124	Aug. 9, 1870.
J. Oliphant - -	109,143	Nov. 8, 1870.
J. G. Allen - -	116,914	July 11, 1871.
J. T. Even - -	117,059	July 18, 1871.
C. L. Holbrook - -	128,624	July 2, 1872.
J. Megratten - -	131,769	Oct. 1, 1872.
C. F. Whorf - -	138,062	April 22, 1873.
Reissued - -	7,088	May 2, 1876.
W. S. Jones - -	140,831	July 15, 1873.

INDEPENDENT HEATERS INSIDE THE CAR. 61

PATENTEE.	NUMBER.	DATE.
A. Reese - - -	142,867	Sept. 16, 1873.
Mooney et al. -	143,526	Oct. 7, 1873.
Berghauser & Kiesling -	144,183	Nov. 4, 1873.
R. F. Rankin -	156,944	Nov. 17, 1874.
J. Mahrenholz - -	152,566	June 30, 1874.
J. S. Post - - -	147,788	Feb. 24, 1874.
W. L. Drake - - -	147,248	Feb. 10, 1874.
T. W. Tyler - - -	159,002	Jan. 19, 1875.
J. Oliphant - - -	163,397	May 18, 1875.
C. A. West - - -	170,321	Nov. 23, 1875.
E. S. Jenison - -	177,847	May 23, 1876.
Grandjean & Cassinelli	180,022	July 18, 1876.
E. E. Hargreaves -	174,523	Mar. 7, 1876.
H. A. Gouge - - -	184,858	Nov. 28, 1876.
O. P. Kennedy - - -	185,545	Dec. 19, 1876.
J. S. Linsley - - -	186,012	Jan. 9, 1877.
J. S. Linsley - - -	186,739	Jan. 30, 1877.
J. H. Prentice - -	187,774	Feb. 27, 1877.
R. Hale - - - -	188,127	Mar. 6, 1877.
G. W. Disman - - -	189,086	April 3, 1877.
S. & G. R. Swartz -	189,668	April 17, 1877.
T. Keetch - - - -	189,743	April 17, 1877.
Pegram & Hotchkiss -	190,780	May 15, 1877.
H. Tanner - - - -	190,929	May 15, 1877.
J. M. Van Dyke - -	191,495	May 29, 1877.
H. O. Peters - - -	192,083	June 19, 1877.
A. C. Goodell - - -	192,067	June 19, 1877.
D. C. Chipman - - -	194,331	Aug. 21, 1877.
B. Rice - - - -	195,231	Sept. 18, 1877.
Root & Baker - - -	195,234	Sept. 18, 1877.
Hotchkiss & Pegram -	195,892	Oct. 9, 1877.
F. C. Conley - - -	199,414	Jan. 22, 1878.
W. F. Condon - - -	200,697	Feb. 26, 1878.
C. J. Smith - - - -	200,771	Feb. 26, 1878.
Lester & Fox - - -	201,183	Mar. 12, 1878.
J. J. Winsor - - -	201,857	Mar. 26, 1878.

PATENTEE.	NUMBER.	DATE.
F. S. Bissell - -	205,467	July 2, 1878.
F. S. Bissell - -	205,468	July 2, 1878.
J. L. Mahan - -	206,339	July 23, 1878.
J. F. Gyles - -	207,865	Sept. 10, 1868.
P. P. Quackenboss - -	208,200	Sept. 17, 1878.
W. F. Condon - -	210,918	Dec. 17, 1878.
Read & Kahler - -	211,261	Jan. 7, 1879.
W. D. DeRusk - -	215,335	May 13, 1879.
G. A. Badger - -	219,898	Sept. 23, 1879.
J. Berg - -	226,220	April 6, 1880.
S. F. Kellogg - -	226,862	April 27, 1880.
N. N. Horton - -	227,977	May 25, 1880.
J. Berg - -	229,854	July 13, 1880.
H. A. Gouge - -	234,666	Nov. 23, 1880.
A. K. Mansfield - -	235,265	Dec. 7, 1880.
J. Berg - -	235,847	Dec. 28, 1880.
M. C. Root - -	235,899	Dec. 28, 1880.
G. Laube - -	237,555	Feb. 8, 1881.
G. B. Kerper - -	239,257	Mar. 22, 1881.
E. H. May - -	242,014	May 24, 1881.
B. V. Seevers - -	249,512	Aug. 18, 1881.
W. F. Condon - -	250,502	Dec. 6, 1881.
M. D. Fitzgerald - -	252,752	Jan. 24, 1882.
W. H. Baldwin - -	258,542	May 30, 1882.
B. Chamberlain - -	259,976	June 20, 1882.
A. W. Herr - -	261,924	Aug. 1, 1882.
W. F. Condon - -	263,118	Aug. 22, 1882.
H. Purdy - -	266,311	Oct. 24, 1882.
G. M. Edwards - -	266,794	Oct. 31, 1882.
Brockway & Watts - -	267,667	Nov. 21, 1882.
A. Reese - -	269,324	Dec. 19, 1882.
A. Reese - -	269,325	Dec. 19, 1882.
J. F. Gyles - -	277,127	May 8, 1883.
B. D. Stevens - -	277,854	May 15, 1883.
L. Stockdale - -	278,466	May 29, 1883.
J. Spear - -	286,341	Oct. 9, 1883.

PATENTEE.	NUMBER.	DATE.
Fife & Pickenpaugh -	287,268	Oct. 23, 1883.
C. Hittenger - -	289,657	Dec. 4, 1883.
A. P. Winslow - -	293,695	Feb. 19, 1884.
J. F. Gyles - - -	293,962	Feb. 19, 1884.
J. F. Gibson - - -	301,713	July 8, 1884.
Hocking & Jones - -	306,615	Oct. 14, 1884.
C. Rowell - - - -	306,864	Oct. 21, 1884.
T. J. Lambert - - -	308,904	Dec. 9, 1884.
Specht & Fix - - -	319,934	June 9, 1885.
W. C. Baker - - - -	331,367	Dec. 1, 1885.
J. A. Faust - - - -	336,221	Feb. 16, 1886.
E. Hambujer - - -	353,558	Nov. 30, 1886.
J. S. Hagerty - - -	362,214	May 3, 1887.
J. L. Brink - - - -	362,928	May 17, 1887.
S. P. Canfield - - -	365,237	June 21, 1887.
H. P. Cope - - - -	365,730	June 28, 1887.
J. H. & S. W. Snyder	366,040	July 5, 1887.
J. W. Fowler - - -	366,087	July 5, 1887.
P. J. Gurnee - - - -	367,711	July 2, 1887.
C. Hofstetter - - -	368,211	Aug. 16, 1887.
M. D. Derrick - - -	370,049	Sept. 20, 1887.
A. Putnam - - - - -	370,085	Sept. 20, 1887.
W. Brown - - - - -	370,853	Oct. 4, 1887.
B. Goldsmith - - - -	371,059	Oct. 4, 1887.
H. C. Dennis - - - -	371,178	Oct. 11, 1887.
Hartman & Frow - -	372,145	Oct. 25, 1887.
J. H. McElrey - - -	372,478	Nov. 1, 1887.
G. F. Higgins - - - -	373,185	Nov. 15, 1887.
H. G. Wilson - - - -	372,779	Nov. 8, 1887.
G. VanWagenen - - -	372,829	Nov. 8, 1887.
G. VanWagenen - - -	372,830	Nov. 8, 1887.
J. W. Post - - - - -	373,567	Nov. 22, 1887.
G. W. Glass - - - - -	373,732	Nov. 22, 1887.
J. Tyler - - - - - -	374,020	Nov. 29, 1887.
L. K. Curlett - - - -	374,659	Dec. 13, 1887.
Howard & Burden - -	374,965	Dec. 20, 1887.

PATENTEE.	NUMBER.	DATE.
Rumble, Symington & Strong - -	376,046	Jan. 3, 1888.
Ross & Brooker - -	376,163	Jan. 10, 1888.
W. H. Durant - -	376,239	Jan. 10, 1888.
R. M. Bache - -	376,275	Jan. 10, 1888.
H. M. Young - -	376,699	Jan. 17, 1888.
B. Millhauser - -	376,749	Jan. 24, 1888.
C. Bassini - -	377,057	Jan. 31, 1888.
Gilbert & Long - -	377,934	Feb. 14, 1888.
M. O. Parker - -	378,938	Mar. 6, 1888.
Smith, Weir, et al. - -	379,995	Mar. 27, 1888.
G. F. Seaver - -	380,057	Mar. 27, 1888.
J. Wardle - -	380,066	Mar. 27, 1888.
L. E. Truesdell - -	380,411	April 3, 1888.
J. A. Jamieson - -	380,630	April 3, 1888.
C. W. Wiecking - -	381,490	April 17, 1888.
L. A. Lyon - -	381,501	April 17, 1888.
T. McCrossnan - -	381,806	April 24, 1888.

HOT WATER.

PATENTEE.	NUMBER.	DATE.
E. H. Ashcroft - -	54,662	May 15, 1866.
Reissue - -	2,917	April 14, 1868.
	6,652	Sept. 21, 1875.
	7,967	Nov. 27, 1877.
W. C. Baker - -	75,345	Mar. 10, 1868.
S. Darling - -	79,449	June 30, 1868.
J. Oliphant - -	109,143	Nov. 8, 1870.
G. F. Stone - -	126,343	April 30, 1872.
J. Q. C. Searle - -	136,773	Mar. 11, 1873.
J. Mahrenholz - -	152,566	June 30, 1874.
E. Densmore - -	152,615	June 30, 1874.
W. B. Hayden - -	161,879	April 13, 1877.
Lemunier & Martin - -	171,826	Jan. 4, 1876.
J. S. Linsley - -	186,012	Jan. 9, 1877.
J. S. Linsley - -	186,739	Jan. 30, 1877.
C. A. West - -	195,679	Sept. 25, 1877.

INDEPENDENT HEATERS INSIDE THE CAR.

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PATENTEE.	NUMBER.	DATE.
Lemunier & Gerard -	207,289	Aug. 20, 1878.
J. A. Salmon -	210,563	Dec. 3, 1878.
J. & W. J. Russell -	212,403	Feb. 18, 1879.
J. A. Salmon -	227,997	May 25, 1880.
Reissued -	10,190	Aug. 29, 1882.
J. Q. C. Searle -	236,849	Jan. 18, 1881.
J. Johnson -	245,504	Aug. 9, 1881.
P. Smith -	251,741	Jan. 3, 1882.
W. C. Baker -	253,253	Feb. 7, 1882.
J. Johnson -	253,389	Feb. 7, 1882.
H. Swindell -	264,116	Sept. 12, 1882.
J. Mason -	271,885	Feb. 6, 1883.
W. F. Condon -	277,546	May 15, 1883.
Johnson & Buerkel -	279,486	June 12, 1883.
J. Q. C. Searle -	304,867	Sept. 9, 1884.
W. D. Mann -	311,021	Jan. 30, 1885.
J. Q. C. Searle -	311,533	Feb. 3, 1885.
J. Q. C. Searle -	311,534	Feb. 3, 1885.
P. Smith -	314,735	Mar. 31, 1885.
J. Q. C. Searle -	340,825	April 27, 1886.
W. C. Baker -	353,839	Dec. 7, 1886.
Johnson & Buerkel -	354,640	Dec. 21, 1886.
H. M. Young -	358,824	Mar. 1, 1887.
J. M. Thayer -	361,380	April 19, 1887.
J. M. Thayer -	361,469	April 19, 1887.
E. A. Olmstead -	367,997	Aug. 9, 1887.
W. P. Patton -	368,489	Aug. 16, 1887.
J. Q. C. Searle -	370,897	Oct. 4, 1887.
R. B. Owen -	372,275	Oct. 25, 1887.
G. Van Wagenen -	372,828	Nov. 8, 1887.
G. Van Wagenen -	372,831	Nov. 8, 1887.
G. Van Wagenen -	372,832	Nov. 8, 1887.
H. M. Young -	373,576	Nov. 22, 1887.
W. W. Whitcomb -	373,626	Nov. 22, 1887.
J. Shackelton -	373,693	Nov. 22, 1887.
G. Leve -	373,898	Nov. 29, 1887.

PATENTEE.	NUMBER.	DATE.
W. C. Baker - -	374,336	Dec. 6, 1887.
W. C. Baker - -	380,544	April 3, 1888.

Analogous Patents.

E. E. Hargreaves -	173,003	Feb. 1, 1876.
G. P. Van Pappelendam -	179,630	July 4, 1876.
E. Hosford - -	358,271	Feb. 22, 1887.
G. Boegler - -	360,199	Mar. 29, 1887.

STEAM.

PATENTEE.	NUMBER.	DATE.
E. H. Ashcroft - -	54,662	May 15, 1866.
J. Oliphant - -	109,143	Nov. 8, 1870.
G. B. Riggins - -	128,174	June 18, 1872.
J. Mahrenholz - -	152,566	June 30, 1874.
J. S. Linsley - -	186,012	Jan. 9, 1877.
J. S. Linsley - -	186,739	Jan. 30, 1877.
G. & J. LeBosquet -	190,054	April 24, 1877.
C. E. Lucas - -	191,691	June 5, 1877.
C. C. Newton - -	205,570	July 2, 1878.
J. W. Graydon - -	209,166	Oct. 22, 1878.
J. A. Salmon - -	210,563	Dec. 3, 1878.
J. A. Salmon - -	227,997	May 25, 1880.
J. W. Graydon - -	245,598	Aug. 9, 1881.
J. A. Forbes - -	303,566	Aug. 12, 1884.
H. E. Freeze - -	325,796	Sept 8, 1885.
J. J. Flynn - -	344,645	June 29, 1886.
H. M. Young - -	358,824	March 1, 1887.
D. Connell - -	379,101	March 6, 1888.

MISCELLANEOUS.

PATENTEE.	NUMBER.	DATE.
W. C. Baker - -	58,755	Oct. 16, 1866.
Hydrocarbon liquid as a heat conducting medium.		
W. C. Baker - -	71,948	Dec. 10, 1867.
Salt water and glycerine.		
A. Davidsohn - -	84,375	Dec. 8, 1868.
Hot sand in perforated boxes.		

INDEPENDENT HEATERS INSIDE THE CAR. 67

PATENTEE.	NUMBER.	DATE.
M. W. Hazelton -	181,437	Aug. 22, 1876.
Metal balls or cylinders in casing.		
W. Wells - - -	187,242	Feb. 13, 1877.
Friction disks driven from car axle.		
J. & J. W. Russell -	212,403	Feb. 18, 1879.
Heat of water is reinforced by hot bars or bricks.		
W. E. Prall - - -	218,685	Aug. 19, 1879.
Tank of hot oil to radiate heat.		
G. W. Baird - - -	237,233	Feb. 1, 1881.
Hatchway with hollow combing, enclosing a steam pipe.		
W. Wells - - -	248,625	Oct. 25, 1881.
Friction disks to heat water.		
M. J. Walsh - - -	269,489	Dec. 19, 1882.
Acetate of potash to retain and give out heat.		
J. Mason - - -	271,885	Feb. 6, 1883.
Acetate of soda.		
Johnson & Buerkel -	288,708	Nov. 20, 1883.
Solution of salt in glycerine and water.		
M. J. Walsh - - -	291,655	Jan. 8, 1884.
Acetate of soda and potash.		
C. Mitchell - - -	295,576	Mar. 25, 1884.
Sodiac salts, fused by steam and then allowed to cool slowly.		
E. Kraschovitz - - -	310,445	Jan. 6, 1885.
Friction drum and brake.		
E. E. Ries - - -	381,816	April 24, 1888.
E. R. Ries - - -	381,817	April 24, 1888.
Dynamo-electric generator driven by car axle sends a current of electricity into translating devices in the car.		
E. E. Ries - - -	381,818	April 24, 1888.
E. E. Ries - - -	381,819	April 24, 1888.
Steam is generated from water by a heat-giving chemical, which is revived automatically at intervals by an electric current.		

SELF-EXTINGUISHING STOVES.

PATENTEE.	NUMBER.	DATE.
A. P. Winslow - -	74,969	Feb. 25, 1868.
S. Darling - -	79,449	June 30, 1868.
Grant, Van Deyne & Pugh	84,183	Nov. 17, 1868.
McGill & Knox - -	84,295	Nov. 24, 1868.
E. Sanger - -	84,308	Nov. 24, 1868.
A. P. Winslow - -	85,348	Dec. 29, 1868.
J. Minor - -	85,750	Jan. 12, 1869.
C. Smith - -	86,255	Jan. 26, 1869.
A. P. Wheelock -	86,790	Feb. 9, 1869.
Reissued - -	3,328	Mar. 16, 1869.
Koontz, Potts & Lewis	88,183	Mar. 23, 1869.
A. J. Pyle - -	89,340	April 27, 1869.
C. Sanborn - -	92,753	July 20, 1869.
Steinhauser & Schriener -	96,498	Nov. 2, 1869.
W. Meller - -	100,543	Mar. 8, 1870.
Stewart & Bradley	101,404	Mar. 29, 1870.
Reissued - -	3,997	May 24, 1870.
S. Meredith - -	101,735	April 12, 1870.
G. Beeman - -	102,080	April 19, 1870.
C. J. Smith - -	103,672	May 31, 1870.
Brase & Salladay -	103,839	June 7, 1870.
J. Q. C. Searle -	105,260	July 12, 1870.
J. Oliphant - -	109,143	Nov. 8, 1870.
J. T. Even - -	117,059	July 18, 1871.
A. Reese - -	142,867	Sept. 16, 1873.
Mooney, et al. -	143,526	Oct. 7, 1873.
W. L. Drake - -	147,248	Feb. 10, 1874.
T. W. Tyler - -	159,002	Jan. 19, 1875.
J. Oliphant - -	163,397	May 18, 1875.
C. A. West - -	170,321	Nov. 23, 1875.
J. H. Prentice - -	187,774	Feb. 27, 1877.
L. Capron - -	190,002	April 24, 1877.
Pegram & Hotchkiss -	190,780	May 15, 1877.
J. M. Van Dyke -	191,495	May 29, 1877.
H. O. Peters - -	192,083	June 19, 1877.

INDEPENDENT HEATERS INSIDE THE CAR.

69

PATENTEE.	NUMBER.	DATE.
D. C. Chipman - -	194,331	Aug. 21, 1877.
Root & Baker - -	195,234	Sept. 18, 1877.
Hotchkiss & Pegram -	195,892	Oct. 9, 1877.
F. C. Conley - -	199,414	Jan. 22, 1878.
W. F. Condon - -	200,697	Feb. 26, 1878.
Lester & Fox - -	201,183	Mar. 12, 1878.
J. J. Winsor - -	201,857	Mar. 26, 1878.
F. S. Bissell - -	205,467	July 2, 1878.
F. S. Bissell - -	205,468	July 2, 1878.
J. F. Gyles - -	207,865	Sept. 10, 1878.
P. P. Quackenboss -	208,200	Sept. 17, 1878.
W. F. Condon - -	210,918	Dec. 17, 1878.
Read & Kahler - -	211,261	Jan. 7, 1879.
J. Berg - -	226,220	April 6, 1880.
J. Berg - -	229,854	July 13, 1880.
J. Berg - -	235,847	Dec. 28, 1880.
W. F. Condon - -	250,502	Dec. 6, 1881.
A. W. Herr - -	261,924	Aug. 1, 1882.
W. F. Condon - -	263,118	Aug. 22, 1882.
H. Purdy - -	266,311	Oct. 24, 1882.
G. M. Edwards - -	266,794	Oct. 31, 1882.
Brockway & Watts -	267,667	Nov. 21, 1882.
A. Reese - -	269,324	Dec. 19, 1882.
A. Reese - -	269,325	Dec. 19, 1882.
J. F. Gyles - -	277,127	May 8, 1883.
C. Hittenger - -	289,657	Dec. 4, 1883.
A. P. Winslow - -	293,695	Feb. 19, 1884.
R. H. Brown - -	302,707	July 29, 1884.
Hocking & Jones -	306,615	Oct. 14, 1884.
T. J. Lambert - -	308,904	Dec. 9, 1884.
J. A. Faust - -	336,221	Feb. 16, 1886.
S. P. Canfield - -	365,237	June 21, 1887.
B. Goldsmith - -	371,059	Oct. 4, 1887.
J. Tyler - -	374,020	Nov. 29, 1887.
Rumble, Symington & Strong - -	376,046	Jan. 3, 1888.

PATENTEE.		NUMBER.	DATE.
Ross & Brooker	-	376,163	Jan. 10, 1888.
W. H. Durant	-	376,239	Jan. 10, 1888.
R. M. Bache	-	376,275	Jan. 10, 1888.
H. M. Young	-	376,699	Jan. 17, 1888.
B. Millhauser	-	376,749	Jan. 24, 1888.
C. Bassini	-	377,057	Jan. 31, 1888.
Gilbert & Long	-	377,934	Feb. 14, 1888.
M. O. Parker	-	378,938	Mar. 6, 1888.
Smith, Weir et al.	-	379,995	Mar. 27, 1888.
G. F. Seaver	-	380,057	Mar. 27, 1888.
L. E. Truesdell	-	380,411	April 3, 1888.
J. A. Jamieson	-	380,630	April 3, 1888.
C. W. Wiecking	-	381,490	April 17, 1888.
L. A. Lyon	-	381,501	April 17, 1888.

Outside the Car—Pendent.

HOT AIR.

(Expired patent numbers are printed in bold-faced type.)

PATENTEE.		NUMBER.	DATE.
A. McWilliams	-	No Number.	Nov. 29, 1832.
H. M. Hutchinson	-	27,449	Mar. 13, 1860.
J. Pine	-	30,347	Oct. 9, 1860.
W. Pauli	-	30,753	Nov. 27, 1860.
J. J. Watson	-	30,996	Dec. 18, 1860.
S. T. Harvey	-	31,716	Mar. 19, 1861.
G. K. Dearborn	-	34,280	Jan. 28, 1862.
W. Westlake	-	36,044	July 29, 1862.
E. H. Reynolds	-	65,010	May 21, 1867.
W. G. Kendrick	-	67,770	Aug. 13, 1867.
Lighthall & North	-	75,172	Mar. 3, 1868.
E. Z. Webster	-	77,786	May 12, 1868.
J. Rice	-	80,505	July 28, 1868.
J. E. Wooten	-	82,672	Sept. 29, 1868.
E. Y. Robbins	-	83,731	Nov. 3, 1868.
W. H. Beal	-	87,532	Mar. 9, 1869.

INDEPENDENT HEATERS OUTSIDE THE CAR. 71

PATENTEE.	NUMBER.	DATE.
F. McManus -	88,055	Mar. 23, 1869.
J. E. Kline -	95,026	Sept. 21, 1869.
J. Gibson -	98,248	Dec. 28, 1869.
J. G. Allen -	107,149	Sept. 6, 1870.
P. Grandjean -	108,702	Oct. 25, 1870.
A. M. Rodgers -	113,348	April 4, 1871.
J. C. Allen -	116,914	July 11, 1871.
B. D. Thompson -	119,249	Sept. 26, 1871.
T. B. Atterbury -	127,945	June 18, 1872.
Bradley & Fulghum -	128,103	June 18, 1872.
W. Thamm -	147,706	Feb. 17, 1874.
J. Wilson -	147,729	Feb. 17, 1874.
J. C. T. Mousseron -	155,540	Sept. 29, 1874.
J. Schmitt -	163,415	May 18, 1875.
J. Amory -	163,908	June 1, 1875.
H. Maey -	177,858	May 23, 1876.
J. C. Bates -	185,474	Dec. 19, 1876.
L. Capron -	190,002	April 24, 1877.
E. O. Huntington -	191,056	May 22, 1877.
W. M. Jackson -	203,918	May 21, 1878.
F. E. Ensign -	208,013	Sept. 17, 1878.
E. M. Berment -	211,214	Jan. 7, 1879.
G. C. Bovey -	211,963	Feb. 4, 1879.
Robertson & Steger -	218,316	Aug. 5, 1879.
J. S. Justh -	220,718	Oct. 21, 1879.
House & Bradbury -	221,733	Nov. 18, 1879.
M. Limpert -	224,194	Feb. 3, 1880.
P. F. Randolph -	239,671	April 5, 1881.
F. L. Kinsman -	241,547	May 17, 1881.
E. Baker -	244,785	July 26, 1881.
H. C. Hood -	245,498	Aug. 9, 1881.
W. G. Semple -	246,223	Aug. 23, 1881.
J. L. Hadden -	246,610	Sept. 6, 1881.
Eastman, Kimball & Murch	247,023	Sept. 13, 1881.
Eastman, Kimball & Murch	248,924	Nov. 1, 1881.
W. E. Eastman -	253,521	Feb. 14, 1882.

CAR HEATING PATENTS.

PATENTEE.	NUMBER.	DATE.
J. E. Steger - -	255,690	Mar. 28, 1882.
Ewins & Wisewell -	258,394	May 23, 1882.
T. S. Page - -	265,336	Oct. 3, 1882.
W. E. Eastman -	269,189	Dec. 19, 1882.
W. D. Nelson - -	270,553	Jan. 9, 1883.
J. Zimmerman -	309,279	Dec. 16, 1884.
J. E. Thoroughgood -	311,151	Jan. 20, 1885.
F. S. Hunter -	319,258	June 2, 1885.
A. B. Vandemark -	326,809	Sept. 22, 1885.
J. Pintsch - -	336,585	Feb. 23, 1886.
W. T. Sears - -	340,826	April 27, 1886.
W. C. Dunn - -	343,445	June 8, 1886.
T. Wiseman - -	353,108	Nov. 23, 1886.
A. R. Chisholm -	358,382	Feb. 22, 1887.
W. C. Dunn - -	359,206	March 8, 1887.
T. A. Long - -	363,149	May 17, 1887.
J. M. Thayer - -	365,030	June 14, 1887.
W. C. Dunn - -	365,977	July 5, 1887.
C. M. Smith - -	366,517	July 12, 1887.
J. M. Seagraves -	369,743	Sept. 13, 1887.
H. M. Young - -	373,575	Nov. 22, 1887.
W. Flanagan - -	375,738	Jan. 3, 1888.
Wilson & Noble - -	376,463	Jan. 17, 1888.

HOT WATER.

PATENTEE.	NUMBER.	DATE.
C. C. Converse - -	62,254	Feb. 19, 1867.
J. H. Wiebee - -	144,425	Nov. 11, 1873.
U. J. Duffield - -	194,418	Aug. 21, 1877.
Lemunier & Gerard -	207,289	Aug. 20, 1878.
H. M. McIntire - -	214,575	April 22, 1879.
J. M. Thayer - -	267,856	Aug. 15, 1882.
A. Morel - -	273,758	Mar. 13, 1883.
W. A. White - -	362,342	May 3, 1887.
J. M. Thayer - -	365,030	June 14, 1887.
W. P. Patton - -	368,488	Aug. 16, 1887.
R. M. Dixon - -	379,691	Mar. 20, 1888.

STEAM.

PATENTEE.		NUMBER.	DATE.
W. M. Fuller	-	148,440	Mar. 10, 1874.
H. M. McIntire	-	214,575	April 22, 1879.
W. C. Baker	-	244,522	July 19, 1881.
W. M. Fuller	-	274,753	Mar. 27, 1883.
N. Slingland	-	284,250	Sept. 4, 1883.
R. H. Brown	-	302,707	July 29, 1884.
J. E. Thoroughgood	-	311,151	Jan. 20, 1885.

MISCELLANEOUS.

PATENTEE.		NUMBER.	DATE.
A. M. Rodgers,	-	113,348	April 4, 1871.
Hot cannon balls or bars of metal. Hot sand in air flue.			
M. W. Hazelton	-	181,437	Aug. 22, 1876.
Hot balls or cylinders in casing.			
H. M. McIntire	-	214,575	April 22, 1879.
Gas stored in cylinders.			
J. S. Justh	-	220,718	Oct. 21, 1879.
Hot sand, bricks, iron, etc., in the chamber.			
H. C. Hood	-	245,498	Aug. 9, 1881.
Heated block inclosed with slow combustibles.			
D. M. Kirkpatrick	-	256,006	April 4, 1882.
Heater on top of car.			
R. Steel	-	277,626	May 15, 1883.
Hot ball in jacketed pocket.			
J. Pintsch	-	336,585	Feb. 23, 1886.
Gas, compressed in a reservoir.			
W. T. Sears	-	340,826	April 27, 1886.
May use a gas stove.			
W. P. Patton	-	368,488	Aug. 16, 1887.
Generates its own gas from oil and water.			

FIRED FROM INSIDE THE CAR.

PATENTEE.		NUMBER.	DATE.
H. M. Hutchinson	-	27,449	Mar. 13, 1860.
W. Pauli	-	30,753	Nov. 27, 1860.

PATENTEE.	NUMBER.	DATE.
J. J. Watson - -	30,996	Dec. 18, 1860.
S. T. Harvey - -	31,716	Mar. 19, 1861.
G. K. Dearborn - -	34,280	Jan. 28, 1872.
W. Westlake - -	36,044	July 29, 1862.
W. G. Kendrick - -	67,770	Aug. 13, 1867.
Lighthall & North - -	75,172	Mar. 3, 1868.
E. Z. Webster - -	77,786	May 12, 1868.
J. Rice - - -	80,505	July 28, 1868.
W. H. Beal - - -	87,532	Mar. 9, 1869.
J. F. Kline - - -	95,026	Sept. 21, 1869.
J. G. Allen - - -	107,149	Sept. 6, 1870.
J. G. Allen - - -	116,914	July 11, 1871.
T. B. Atterbury - -	127,945	June 18, 1872.
Bradley & Fulghum - -	128,103	June 18, 1872.
J. H. Weibee - - -	144,425	Nov. 11, 1873.
W. M. Fuller - - -	148,440	Mar. 10, 1874.
J. Wilson - - -	147,729	Feb. 17, 1874.
J. Schmitt - - -	163,145	May 18, 1875.
L. Capron - - -	190,002	April 24, 1877.
U. G. Duffield - - -	194,418	Aug. 21, 1877.
W. M. Jordan - - -	203,918	May 21, 1878.
Lemunier & Gerard - -	207,289	Aug. 20, 1878.
F. E. Ensign - - -	208,023	Sept. 17, 1878.
E. M. Bement - - -	211,214	Jan. 7, 1879.
M. Limpert - - -	224,194	Feb. 3, 1880.
G. C. Bovey - - -	227,345	May 11, 1880.
P. F. Randolph - - -	239,670	April 5, 1881.
F. L. Kinsman - - -	241,547	May 17, 1881.
W. G. Semple - - -	246,223	Aug. 23, 1881.
Ewins & Wisewell - -	258,394	May 23, 1882.
J. M. Thayer - - -	262,856	Aug. 15, 1882.
W. M. Fuller - - -	274,753	Mar. 27, 1883.
J. E. Thoroughgood - -	311,151	Jan. 20, 1885.
F. S. Hunter - - -	319,258	June 2, 1885.
J. N. Thayer - - -	365,030	June 14, 1887.
J. M. Segraves - - -	369,743	Sept. 13, 1887.

FIRED FROM OUTSIDE THE CAR.

PATENTEE.	NUMBER.	DATE.
J. Pine - - -	30,347	Oct. 9, 1860.
C. C. Converse - -	62,254	Feb. 19, 1867.
E. H. Reynolds - -	65,010	May 21, 1867.
J. Rice - - -	80,505	July 28, 1868.
J. E. Wooten - - -	82,672	Sept. 29, 1868.
E. Y. Robbins - - -	83,731	Nov. 3, 1868.
F. McManus - - -	88,055	Mar. 23, 1869.
J. E. Kline - - -	95,026	Sept. 21, 1869.
J. Gibson - - -	98,248	Dec. 28, 1869.
P. Grandjean - - -	108,702	Oct. 25, 1870.
W. Thamm - - -	147,706	Feb. 17, 1874.
J. C. T. Mouserion - -	155,540	Sept. 29, 1874.
J. Amory - - -	163,908	June 1, 1875.
H. Maey - - -	177,858	May 23, 1876.
E. O. Huntington - -	191,056	May 22, 1887.
Lemunier & Gerard - -	207,289	Aug. 20, 1878.
G. C. Bovey - - -	211,963	Feb. 4, 1879.
G. C. Bovey - - -	227,345	May 11, 1880.
W. C. Baker - - -	244,522	July 19, 1881.
J. L. Hadden - - -	246,610	Sept. 6, 1881.
Eastman, Kimball & Murch	247,028	Sept. 13, 1881.
J. E. Steger - - -	255,690	Mar. 28, 1882.
T. S. Page - - -	265,336	Oct. 3, 1882.
W. D. Nelson - - -	270,553	Jan. 9, 1883.
A. More - - -	273,758	Mar. 13, 1883.
N. Slingland - - -	284,250	Sept. 4, 1883.
T. Wiseman - - -	353,108	Nov. 23, 1886.
A. R. Chisholm - - -	358,382	Feb. 22, 1887.
W. A. White - - -	362,342	May 3, 1887.
C. M. Smith - - -	366,517	July 12, 1887.
Wilson & Noble - - -	376,463	Jan. 17, 1888.

OIL BURNERS.

PATENTEE.	NUMBER.	DATE.
C. C. Converse - -	62,254	Feb. 19, 1867.
E. H. Reynolds - -	65,010	May 21, 1867.

PATENTEE.		NUMBER.	DATE.
B. D. Thompson	-	119,249	Sept. 26, 1871.
Lemunier & Gérard	-	207,289	Aug. 20, 1878.
Robertson & Steger	-	218,316	Aug. 5, 1879.
House & Bradbury	-	221,733	Nov. 18, 1879.
E. Baker	-	244,785	July 26, 1881.
Eastman, Kimball & Murch		248,924	Nov. 1, 1881.
W. E. Eastman	-	253,521	Feb. 14, 1882.
W. E. Eastman	-	269,189	Dec. 19, 1882.
A. B. Vandemark	-	326,809	Sept. 22, 1885.
W. T. Sears	-	340,826	April 27, 1886.
W. C. Dunn	-	343,445	June 8, 1886.
W. C. Dunn	-	359,206	Mar. 8, 1887.
T. A. Long	-	363,149	May 17, 1887.
W. C. Dunn	-	365,977	July 5, 1887.
W. P. Patton	-	368,488	Aug. 16, 1887.
H. M. Young	-	373,575	Nov. 22, 1887.
W. Flanagan	-	375,738	Jan. 3, 1888.

CONTINUOUS HEATERS.

(Expired patent numbers are printed in **bold-faced type**.)

HOT AIR.

Heat from Locomotive—Fire.

PATENTEE.	NUMBER.	DATE.
T. Townsend - -	4,654	July 24, 1846.
S. Lloyd - -	74,386	Feb. 11, 1868.
S. W. Francis - -	77,270	April 28, 1868.
E. Spencer - -	84,969	Dec. 15, 1868.
T. B. Field - -	161,108	Mar. 23, 1875.
W. Sager - -	166,415	Aug. 3, 1875.
W. H. Kilborn - -	188,802	Mar. 27, 1877.
L. T. White - -	196,961	Nov. 6, 1877.
White & Henderson - -	257,795	May 9, 1882.
J. H. Ballard - -	366,445	July 12, 1887.
Lanahan & Roberts - -	367,347	July 26, 1887.
J. L. Bangley - -	367,393	Aug. 2, 1887.
T. Saunders - -	372,989	Nov. 8, 1887.
M. Wanner - -	374,766	Dec. 13, 1887.
T. R. White - -	375,521	Dec. 27, 1887.
F. J. Crouch - -	380,247	Mar. 27, 1888.

Analagous Patents—Feeding Air.

B. T. Babbitt - -	172,368	Jan. 18, 1876.
J. V. Motter - -	214,176	April 8, 1879.
J. Campbell - -	264,136	Sept. 12, 1882.
J. N. Weaver - -	299,705	June 3, 1884.
T. C. Craven - -	311,475	Feb. 3, 1885.
O. D. Davis - -	313,611	Mar. 10, 1885.
S. Bissell - -	335,558	Feb. 9, 1886.
J. Ham - -	360,385	Mar. 29, 1887.

Heat from Locomotive—Steam.

S. W. Francis - -	77,270	April 28, 1868.
E. L. Roberts - -	81,211	Aug. 19, 1868.
A. Weeks - -	85,712	Jan. 5, 1869.
W. S. Deeds - -	147,829	Feb. 24, 1874.

PATENTER.		NUMBER.	DATE.
N. N. Horton	- -	245,380	Aug. 9, 1881.
W. E. Depp	- -	365,975	July 5, 1887.
J. H. Ballard	- -	366,445	July 12, 1887.
J. Lewis	- -	372,032	Oct. 25, 1887.
T. J. Simpson	- -	381,589	April 24, 1888.

Heat independent of Locomotive.

C. Pepper	- -	20,021	April 30, 1858.
A. J. Marshall	- -	67,894	Aug. 20, 1867.
S. Lloyd	- -	74,386	Feb. 11, 1868.
D. H. Dotterer	- -	74,899	Feb. 25, 1868.
J. Rice	- -	80,505	July 28, 1868.
C. Carpenter	- -	81,137	Aug. 18, 1868.
E. L. Roberts	- -	81,211	Aug. 18, 1868.
J. R. Amsden	- -	81,322	Aug. 25, 1868.
H. M. Britton	- -	81,873	Sept. 8, 1868.
Smith & Reilly	- -	82,855	Oct. 6, 1868.
J. R. Guy	- -	88,488	Oct. 27, 1868.
A. Weeks	- -	85,712	Jan. 5, 1869.
A. Weeks	- -	89,529	April 27, 1869.
D. C. Chipman	- -	91,824	June 29, 1869.
T. N. Morse	- -	96,945	Nov. 16, 1869.
F. & J. Chalfant	- -	159,541	Feb. 9, 1875.
J. Story	- -	168,426	Oct. 5, 1875.
N. N. Horton	- -	245,380	Aug. 9, 1881.
I. S. Shirpsier	- -	281,801	July 24, 1883.
C. Turner	- -	340,258	April 20, 1886.
S. A. Darrach	- -	372,605	April 20, 1886.
Casselman & McGann	- -	376,138	Jan. 10, 1888.

Analogous Patents.

G. Van Duzer	-	319,358	June 2, 1885.
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Forced Circulation.

A. J. Marshall	-	67,894	Aug. 20, 1867.
S. Lloyd	- -	74,386	Feb. 11, 1868.
D. H. Dotterer	- -	74,899	Feb. 25, 1868.
C. Carpenter	- -	81,137	Aug. 18, 1868.

PATENTEE.		NUMBER.	DATE.
I. R. Amsden	-	81,322	Aug. 25, 1868.
H. M. Britton	-	81,873	Sept. 8, 1868.
Smith & Reilly	-	82,885	Oct. 6, 1868.
J. R. Guy	-	83,488	Oct. 27, 1868.
T. N. Morse	-	96,945	Nov. 16, 1869.
W. S. Deeds	-	147,829	Feb. 24, 1874.
T. & J. Chalfant	-	159,541	Feb. 9, 1875.
T. B. Field	-	161,108	Mar. 23, 1875.
W. Sager	-	166,415	Aug. 3, 1875.
J. Story	-	168,426	Oct. 5, 1875.
W. H. Kilbourn	-	188,802	Mar. 27, 1877.
L. T. White	-	196,961	Nov. 6, 1877.
N. N. Horton	-	245,380	Aug. 9, 1881.
White & Henderson	-	257,795	May 9, 1882.
I. Shirpser	-	281,801	July 24, 1883.
W. E. Depp	-	365,975	July 5, 1887.
J. H. Ballard	-	366,445	July 12, 1887.
Lanahan & Roberts	-	367,347	July 26, 1887.
J. Lewis	-	372,032	Oct. 25, 1887.
S. Darrach	-	372,605	Nov. 1, 1887.
T. Saunders	-	372,989	Nov. 8, 1887.
M. Wanner	-	374,766	Dec. 13, 1887.
T. R. White	-	375,521	Dec. 27, 1887.
Casselman & McGann	-	376,138	Jan. 10, 1888.
F. J. Crouch	-	380,247	Mar. 27, 1888.
T. J. Simpson	-	381,589	April 24, 1888.

Circulation caused by Motion of the Train.

T. Townsend	-	4,654	July 24, 1846.
C. Pepper	-	20,021	April 30, 1858.
S. Lloyd	-	74,386	Feb. 11, 1868.
S. W. Francis	-	77,270	April 28, 1868.
J. Rice	-	80,505	July 28, 1868.
E. L. Roberts	-	81,211	Aug. 18, 1868.
E. Spencer	-	84,969	Dec. 15, 1868.
A. Weeks	-	85,712	Jan. 5, 1869.

PATENTEE.	NUMBER.	DATE.
A. Weeks - -	89,529	April 27, 1869.
D. C. Chipman - -	91,824	June 29, 1869.
W. H. Kilbourn - -	188,802	Mar. 27, 1877.
C. Turner - -	340,258	April 20, 1886.
J. L. Bangley - -	367,693	Aug. 2, 1887.
T. Saunders - -	372,989	Nov. 8, 1887.
Casselman & McGann - -	376,138	Jan. 10, 1888.
Air Admitted Directly to Car.		
T. Townsend - -	4,654	July 24, 1846.
C. Pepper - -	20,021	April 30, 1858.
A. J. Marshall - -	67,894	Aug. 20, 1867.
S. Lloyd - -	74,386	Feb. 11, 1868.
D. H. Dotterer - -	74,899	Feb. 25, 1868.
S. W. Francis - -	77,270	April 28, 1868.
J. Rice - -	80,505	July 28, 1868.
C. Carpenter - -	81,137	Aug. 18, 1868.
E. L. Roberts - -	81,211	Aug. 18, 1868.
I. R. Amsden - -	81,322	Aug. 25, 1868.
H. M. Britton - -	81,873	Sept. 8, 1868.
Smith & Reilly - -	82,885	Oct. 6, 1868.
J. R. Guy - -	83,488	Oct. 27, 1868.
E. Spencer - -	84,969	Dec. 15, 1868.
A. Weeks - -	85,712	Jan. 5, 1869.
A. Weeks - -	89,529	April 27, 1869.
D. C. Chipman - -	91,824	June 29, 1869.
T. N. Morse - -	96,945	Nov. 16, 1869.
W. S. Deeds - -	147,829	Feb. 24, 1874.
F. & J. Chalfant - -	159,541	Feb. 9, 1875.
T. B. Field - -	161,108	Mar. 23, 1875.
W. Sager - -	166,415	Aug. 3, 1875.
J. Story - -	168,426	Oct. 5, 1875.
N. N. Horton - -	245,380	Aug. 9, 1881.
White & Henderson - -	257,795	May 9, 1882.
I. Shirpser - -	281,801	July 24, 1883.
C. Turner - -	340,258	April 20, 1886.
W. E. Depp - -	365,975	July 5, 1887.

PATENTEE.	NUMBER.	DATE.
J. H. Ballard - -	366,445	July 12, 1887.
Lanahan & Roberts -	367,347	July 26, 1887.
J. L. Bangley - -	367,693	Aug. 2, 1887.
T. Saunders - -	372,989	Nov. 8, 1887.
T. R. White - -	375,521	Dec. 27, 1887.
Casselman & McGann	376,138	Jan. 10, 1888.
E. J. Crouch - -	380,247	Mar. 27, 1888.

Air Held in Radiators.

Smith & Reilly - -	82,885	Oct. 6, 1868.
W. H. Kilbourn - -	188,802	Mar. 27, 1877.
L. T. White - -	196,961	Nov. 6, 1877.
J. Lewis - -	372,032	Oct. 25, 1887.
S. A. Darrach - -	372,605	Nov. 1, 1887.
T. Saunders - -	372,989	Nov. 8, 1887.
M. Wanner - -	374,766	Dec. 13, 1887.
F. J. Crouch - -	380,247	Mar. 27, 1888.
T. J. Simpson - -	381,589	April 24, 1888.

Couplings.

A. J. Marshall - -	67,894	Aug. 20, 1867.
S. Lloyd - -	74,386	Feb. 11, 1868.
S. W. Francis - -	77,270	April 28, 1868.
T. S. Speakman - -	77,331	April 28, 1868.
J. Rice - -	80,505	July 28, 1868.
E. L. Roberts - -	81,211	Aug. 18, 1868.
Smith & Reilly - -	82,885	Oct. 6, 1868.
J. R. Guy - -	83,488	Oct. 27, 1868.
M. S. Bolt - -	85,559	Jan. 5, 1869.
A. Weeks - -	85,712	Jan. 5, 1869.
D. C. Chipman - -	91,824	June 29, 1869.
T. Smith - -	95,528	Oct. 5, 1869.
T. N. Morse - -	96,945	Nov. 16, 1869.
F. R. Hunt - -	100,896	Mar. 15, 1870.
H. R. Robbins - -	114,349	May 2, 1871.
Reissued - -	4,922	May 28, 1872.
M. Hensey - -	139,150	May 20, 1873.

PATENTEE.		NUMBER.	DATE.
W. S. Deeds	- -	147,829	Feb. 24, 1874.
W. S. Deeds	- -	149,842	April 21, 1874.
F. R. Hunt	- -	159,679	Feb. 9, 1875.
R. H. Moss	- -	193,174	July 17, 1877.
Wood & Scull	- -	193,679	July 31, 1877.
L. T. White	- -	196,961	Nov. 6, 1877.
J. W. Graydon	- -	203,611	May 14, 1878.
T. T. Farnsworth	- -	205,069	June 18, 1878.
F. King	- -	210,459	Dec. 3, 1878.
N. N. Horton	- -	245,380	Aug. 9, 1881.
J. J. Lacey	- -	295,255	Mar. 18, 1884.
C. Turner	- -	340,258	April 20, 1886.
M. Wanner	- -	374,766	Dec. 13, 1887.
T. R. White	- -	375,521	Dec. 27, 1887.

Analogous Patents in Spark Conductors.

L. P. Teed	- -	29,531	Aug. 7, 1860.
J. Greacen	- -	29 880	Sept. 4, 1860.
R. Wright	- -	89,371	April 27, 1869.
J. J. Breslin	- -	89,848	May. 11, 1869.
L. Powell	- -	97,807	Dec. 14, 1869.
A. Storm	- -	131,639	Sept. 24, 1872.
T. D. Codezo	- -	143,812	Oct. 21, 1873.
T. D. Codezo	- -	151,099	May 19, 1874.
J. S. Thomas	- -	156,187	Oct. 20, 1874.
Brancher & Ring	- -	160,301	March 2, 1875.
C. K. Cullers	- -	169,964	Nov. 16, 1875.
L. M. Hosea	- -	173,407	Feb. 15, 1876.
W. G. Gale	- -	187,001	Feb. 6, 1877.
J. Casey	- -	202,518	Aug. 16, 1878.
R. F. Hill	- -	209,260	Oct. 22, 1878.
DeTurk & Olds	- -	216,783	June 24, 1879.
J. S. Lloyd	- -	227,550	May 11, 1880.
E. T. Watkins	- -	235,474	Dec. 14, 1880.
Brown & Smith	- -	276,664	May 1, 1883.
O. S. Tavshanjian	- -	281,581	July 17, 1883.
C. C. Baum	- -	282,484	Aug. 7, 1883.

CONTINUOUS HEATERS.

83

PATENTEE.		NUMBER.	DATE.
F. B. Wells	-	283,839	Aug. 28, 1883.
L. C. Johnson	-	290,586	Dec. 18, 1883.
T. J. Simpson	-	334,680	Jan. 19, 1886.
J. H. Meacham	-	345,524	July 13, 1886.

STEAM.

Steam from Locomotive Boiler.

PATENTEE.		NUMBER.	DATE.
G. W. Samson	-	32,843	July 16, 1861.
R. A. Cheseborough	-	73,781	May 12, 1868.
G. W. Eddy	-	76,175	Mar. 31, 1868.
A. C. Crary	-	77,871	May 12, 1868.
A. C. Miner	-	78,990	June 16, 1868.
C. Carpenter	-	81,137	Aug. 18, 1868.
W. B. Farwell	-	82,210	Nov. 15, 1868.
F. M. Meddock	-	83,076	Oct. 13, 1868.
A. C. Crary	-	87,472	Mar. 2, 1869.
A. C. Crary	-	88,852	April 13, 1869.
A. C. Crary	-	91,524	June 22, 1869.
F. Shaler	-	100,333	Mar. 1, 1870.
J. Shackleton	-	115,533	May 30, 1871.
Mabie, Whitcomb & Brown		122,326	Jan 2, 1872.
C. F. Pike	-	124,973	Mar. 26, 1872.
McDuffey & Jacques	-	135,137	Jan. 21, 1873.
Michaels & Broadwell		135,239	Jan. 28, 1873.
J. O. Osborne	-	186,495	Jan. 23, 1877.
J. D. Murray	-	194,456	Aug. 21, 1877.
J. F. Cassaway	-	195,792	Oct. 2, 1877.
*W. Smith	-	201,061	Mar. 5, 1878.
A. S. Brownell	-	207,588	Sept. 3, 1878.
W. C. Baker	-	209,793	Nov. 12, 1878.
J. W. Graydon	-	212,374	Feb. 18, 1879.
J. W. Graydon	-	212,375	Feb. 18, 1879.
J. W. Graydon	-	212,376	Feb. 18, 1879.
J. A. Straight	-	214,532	April 22, 1879.
W. B. Pope	-	240,267	April 19, 1871.
E. E. Gold	-	242,299	May 31, 1881.

PATENTEE.	NUMBER.	DATE.
W. C. Baker - -	244,108	July 12, 1881.
E. E. Gold - -	253,693	Feb. 14, 1882.
M. J. Walsh - -	263,263	Aug. 22, 1882.
M. J. Walsh - -	263,264	Aug. 22, 1882.
M. J. Walsh - -	263,266	Aug. 22, 1882.
M. J. Walsh - -	264,050	Sept. 5, 1882.
W. H. Ward - -	264,913	Sept. 26, 1882.
W. H. Ward - -	264,914	Sept. 26, 1882.
D. D. & J. H. Sewall	265,284	Aug. 3, 1882.
E. E. Gold - -	309,299	Dec. 16, 1884.
J. Emerson - -	314,006	Mar. 17, 1885.
E. D. Cody - -	329,017	Oct. 27, 1885.
H. R. Robbins - -	364,134	May 31, 1887.
J. S. Lash - -	364,527	June 7, 1887.
F. M. Wilder - -	373,039	June 28, 1887.
J. S. Case - -	366,761	July 19, 1887.
W. Martin - -	371,959	Oct. 25, 1887.
R. Coddington - -	372,061	Oct. 25, 1887.
F. M. Wilder - -	373,039	Nov. 8, 1887.
J. H. Sewall - -	373,314	Nov. 15, 1887.
M. B. Stafford - -	373,495	Nov. 22, 1887.
J. Henny, Jr. - -	373,659	Nov. 22, 1887.
J. Shackleton - -	373,693	Nov. 22, 1887.
J. H. Sewall - -	374,275	Dec. 6, 1887.
W. M. Scott - -	381,647	April 24, 1888.

Steam from Special Boiler.

A. C. Crary - -	77,171	May 12, 1868.
G. W. Eddy - -	76,175	Mar. 31, 1868.
A. C. Crary - -	91,524	June 22, 1869.
Scripture & Stackman	142,737	Sept. 9, 1873.
W. H. Ward - -	264,913	Sept. 26, 1882.
W. Martin - -	267,009	Nov. 7, 1882.
G. Van Duzen - -	319,358	June 2, 1885.
J. S. Case - -	366,761	July 19, 1887.
J. Shackleton - -	337,693	Nov. 22, 1887.

			Couplings.	
PATENTEE.			NUMBER.	DATE.
L. Kirk -	-	-	5,325	Oct. 9, 1847.
G. W. Samson	-	-	32,843	July 16, 1861.
C. R. Abbott	-	-	72,258	Dec. 17, 1867.
T. S. Speakman	-	-	77,331	April 28, 1868.
A. C. Crary	-	-	77,871	May 12, 1868.
H. R. Robbins	-	-	78,134	May 19, 1868.
S. Ainsworth	-	-	81,572	Sept. 1, 1868.
W. B. Farwell	-	-	82,210	Nov. 15, 1868.
W. H. Yeaton	-	-	83,118	Oct. 13, 1868.
J. R. Guy	-	-	83,488	Oct. 27, 1868.
G. A. Fullerton	-	-	85,377	Dec. 29, 1868.
M. S. Bolt	-	-	85,559	Jan. 5, 1869.
A. C. Crary	-	-	87,472	Mar. 2, 1869.
H. R. Robbins	-	-	114,349	May 2, 1871.
Reissued	-	-	4,922	May 28, 1872.
J. Shackleton	-	-	115,533	May 30, 1871.
Mabie, Whitcomb & Brown	-	-	122,326	Jan. 2, 1872.
S. N. Goodale	-	-	123,776	Feb. 20, 1872.
McDuffey & Jacques	-	-	135,137	Jan. 21, 1873.
Michaels & Broadwell	-	-	135,239	Jan. 28, 1873.
A. G. Story	-	-	138,822	May 13, 1873.
M. Henszey	-	-	139,150	May 20, 1873.
T. H. Mott	-	-	141,372	July 29, 1873.
J. Dahmer	-	-	146,990	Feb. 3, 1874.
G. M. Hopkins	-	-	162,169	April 20, 1875.
F. A. Miller	-	-	178,178	May 30, 1876.
Wood & Scull	-	-	193,679	July 31, 1877.
W. W. H. Robinson	-	-	195,049	Sept. 11, 1877.
F. King	-	-	198,027	Dec. 11, 1877.
J. W. Graydon	-	-	203,611	May 14, 1878.
T. T. Farnsworth	-	-	205,069	June 19, 1878.
F. King	-	-	210,459	Dec. 3, 1878.
E. L. Brady	-	-	210,910	Dec. 17, 1878.
J. W. Graydon	-	-	212,374	Feb. 18, 1879.

PATENTEE.	NUMBER.	DATE.
J. W. Graydon - -	212,376	Feb. 18, 1879.
F. Woodbridge - -	216,010	May 27, 1879.
J. E. Chapin - -	221,153	Nov. 4, 1879.
J. E. Chapin - -	221,154	Nov. 4, 1879.
Hand & Reitzel - -	230,018	July 13, 1880.
L. P. Lawrence - -	232,279	Sept. 14, 1880.
J. Kenyon - -	235,777	Dec. 21, 1880.
J. T. Houchens - -	242,201	May 31, 1881.
M. J. Walsh - -	263,264	Aug. 22, 1882.
M. J. Walsh - -	263,266	Aug. 22, 1882.
W. H. Ward - -	264,913	Sept. 26, 1882.
W. H. Ward - -	264,914	Sept. 26, 1882.
W. Martin - -	268,917	Dec. 12, 1882.
M. Hurley - -	289,265	Nov. 27, 1883.
J. J. Lacey - -	295,255	Mar. 18, 1884.
W. Martin - -	299,661	June 3, 1884.
W. Martin - -	299,662	June 3, 1884.
F. E. Mertens - -	299,827	June 3, 1884.
J. Emerson - -	314,007	Mar. 17, 1885.
J. J. Lacey - -	324,031	Aug. 11, 1885.
J. R. Drodzewski - -	348,664	Sept. 7, 1886.
E. E. Gold - -	349,991	Sept. 28, 1886.
J. R. Drodzewski - -	363,374	May 24, 1887.
J. H. Sewall - -	363,553	May 24, 1887.
H. R. Robbins - -	364,134	May 31, 1887.
J. S. Lash - -	364,527	June 7, 1887.
G. H. Benjamin - -	368,906	Aug. 23, 1887.
R. H. Smith - -	369,287	Sept. 13, 1887.
J. H. Chambers - -	370,606	Sept. 27, 1887.
P. Dufresne - -	371,558	Oct. 18, 1887.
R. Coddington - -	372,061	Oct. 25, 1887.
J. Emerson - -	372,303	Nov. 1, 1887.
B. R. Deacon - -	372,363	Nov. 1, 1887.
W. L. Van Harlingen - -	372,946	Nov. 8, 1887.
W. L. Van Harlingen - -	372,947	Nov. 8, 1887.
Jacobson & Bade - -	373,292	Nov. 15, 1887.

PATENTEE.		NUMBER.	DATE.
W. F. Grassler	-	374,059	Nov. 29, 1887.
J. Shackelton	-	374,089	Nov. 29, 1887.
F. G. Bottsford	-	374,447	Dec. 6, 1887.
G. Gibbs	-	375,547	Dec. 27, 1887.
J. H. Sewall	-	375,572	Dec. 27, 1887.
G. H. Benjamin	-	376,061	Jan. 10, 1888.
N. Curtis	-	376,075	Jan. 10, 1888.
J. R. Drodzewski	-	377,065	Jan. 31, 1888.
F. A. Jacob	-	377,075	Jan. 31, 1888.
L. T. White	-	377,130	Jan. 31, 1888.
J. Briscoe	-	378,284	Feb. 21, 1888.
H. Knaub	-	378,932	Mar. 6, 1888.
P. M. Askren	-	379,628	Mar. 20, 1888.
D. W. Magee	-	379,798	Mar. 20, 1888.
H. Fenton	-	379,947	Mar. 27, 1888.

Valved Couplings.

W. H. Yeaton	-	83,118	Oct. 13, 1868.
G. A. Fullerton	-	85,377	Dec. 29, 1868.
A. C. Crary	-	87,472	Mar. 2, 1869.
G. Westinghouse	-	109,695	Nov. 29, 1870.
G. Westinghouse	-	116,655	July 4, 1871.
Mabie, Whitcomb & Brown		122,326	Jan. 2, 1872.
McDuffey & Jacques	-	135,137	Jan. 21, 1873.
G. Westinghouse	-	136,396	Mar. 4, 1873.
G. Westinghouse	-	136,397	Mar. 4, 1873.
G. Westinghouse	-	136,631	Mar. 11, 1873.
T. E. Button	-	137,823	April 15, 1873.
T. H. Mott	-	141,372	July 29, 1873.
J. Y. Smith	-	146,367	Jan. 13, 1874.
E. W. King	-	151,885	June 9, 1874.
G. M. Hopkins	-	162,169	April 30, 1875.
W. M. Henderson	-	165,415	July 13, 1875.
G. T. Taylor	-	168,808	Oct. 11, 1875.
D. W. Magee	-	182,376	Sept. 19, 1876.
Pirsson & Oliver	-	187,982	Mar. 6, 1877.
F. W. Eames	-	193,078	July 17, 1877.

PATENTEE.	NUMBER.	DATE.
Burden & Pleassance -	194,575	Aug. 28, 1877.
W. W. H. Robinson -	195,049	Sept. 11, 1877.
F. W. Eames - -	198,584	Dec. 25, 1877.
W. H. Smith - -	200,944	Mar. 5, 1878.
G. H. Newton - -	202,368	April 16, 1878.
G. Westinghouse, Re-issue	8,291	June 18, 1878.
Gardner & Rawson, Re-issue	8,337	July 16, 1878.
F. King - - -	210,459	Dec. 3, 1878.
J. W. Graydon - -	212,374	Feb. 18, 1879.
J. W. Graydon - -	212,376	Feb. 18, 1879.
G. Westinghouse - -	214,335	April 15, 1879.
G. Westinghouse - -	214,336	April 15, 1879.
F. Woodbridge - -	216,010	May 27, 1879.
J. E. Chapin - -	221,153	Nov. 4, 1879.
T. W. Welsh - -	221,987	Nov. 25, 1879.
W. J. Stevens - -	222,326	Dec. 2, 1879.
W. J. Stevens - -	223,183	Dec. 30, 1879.
C. G. Welch - - -	224,256	Feb. 3, 1880.
L. P. Lawrence - -	232,279	Sept. 14, 1880.
J. Kenyon - - -	235,777	Dec. 21, 1880.
G. Westinghouse - -	236,388	Jan. 4, 1881.
J. T. Houchens - -	242,201	May 31, 1881.
G. Westinghouse - -	249,128	Nov. 1, 1881.
R. S. Kelsey - - -	308,843	Dec. 2, 1884.
J. Emerson - - -	314,007	Mar. 17, 1885.
C. R. Van Ruynenn -	314,758	Mar. 31, 1885.
J. J. Lacy - - -	324,031	Aug. 11, 1885.
J. R. Drodzewski - -	348,664	Sept 7, 1886.
R. M. McKinney - -	352,552	Nov. 16, 1886.
R. E. Ismond - - -	357,603	Feb. 15, 1887.
R. H. Lepage - - -	360,229	Mar. 29, 1887.
R. Solano - - - -	360,924	April 12, 1887.
B. R. Deacon - - -	372,363	Nov. 1, 1887.
W. L. Van Harlingen -	372,946	Nov. 8, 1887.
W. L. Van Harlingen	372,947	Nov. 8, 1887.
Traver & Weeks - -	373,256	Nov. 15, 1881.

CONTINUOUS HEATERS.

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PATENTEE.	NUMBER.	DATE.
W. F. Grassler -	374,059	Nov. 29, 1887.
J. Bersch -	375,253	Dec. 20, 1887.
Couplings—Analogous Patents in Steam and Air Brakes.		
W. Wright -	12,263	Jan. 16, 1855.
S. N. Goodale -	47,943	May 30, 1865.
Reissued -	4,779	Mar. 5, 1872.
G. Westinghouse -	88,929	April 13, 1879.
Gadner & Ranson -	128,220	June 25, 1872.
J. C. Wightman -	130,095	July 30, 1872.
S. N. Goodale -	130,216	Aug. 6, 1872.
D. Myers -	138,515	May 6, 1873.
S. Rhinehart -	152,413	June 23, 1874.
Fouts & Planch -	161,677	April 6, 1875.
W. J. Stevens -	191,261	May 29, 1877.
H. L. Perrine -	193,279	July 17, 1877.
Green, Hoag & Cleveland	198,015	Dec. 11, 1877.
G. H. Griggs -	202,942	April 30, 1878.
F. A. Sheeley -	204,383	May 28, 1878.
W. Patterson -	211,775	Jan. 28, 1879.
W. N. Haring -	231,564	Aug. 24, 1880.
W. N. Haring -	231,565	Aug. 24, 1880.
H. B. Howard -	233,513	Oct. 19, 1880.
C. W. Lanpher -	250,823	Dec. 13, 1881.
C. E. Mark -	314,695	Mar. 31, 1885.
C. F. Mark -	329,326	Oct. 27, 1885.
L. Lerede -	330,134	Nov. 10, 1885.
Leconteaux & Garnier	358,848	Mar. 30, 1886.
W. J. McCoy -	342,527	May 25, 1888.
J. T. Melson -	352,927	Nov. 23, 1886.
M. L. Babb -	367,578	Aug. 2, 1887.
L. Etienne -	372,790	Nov. 8, 1887.
C. Turner -	373,109	Nov. 15, 1887.

AUXILIARY HEATERS.

PATENTEE.	NUMBER.	DATE.
Scripture & Stackman -	142,737	Sept. 9, 1873.
J. Emerson -	314,006	Mar. 17, 1885.

CAR HEATING PATENTS.

PATENTEE.	NUMBER.	DATE.
F. M. Wilder - -	365,715	June 28, 1887.
J. H. Sewall - -	373,314	Nov. 15, 1887.
M. B. Stafford - -	373,495	Nov. 22, 1887.
J. Shackleton - -	373,693	Nov. 22, 1887.
J. H. Sewall - -	374,275	Dec. 6, 1887.

SECONDARY HEATERS.

PATENTEE.	NUMBER.	DATE.
C. F. Pike - -	124,973	Mar. 26, 1872.
Michaels & Broadwell - -	135,239	Jan. 28, 1873.
W. C. Baker - -	209,793	Nov. 12, 1878.
W. B. Pope - -	240,267	April 19, 1881.
E. E. Gold - -	253,693	Feb. 14, 1882.
E. E. Gold - -	242,299	May 31, 1881.
M. J. Walsh - -	263,266	Aug. 22, 1882.
M. J. Walsh - -	264,050	Sept. 5, 1882.
E. E. Gold - -	309,299	Dec. 16, 1884.
F. M. Wilder - -	365,715	June 28, 1887.
J. Shackleton - -	373,693	Nov. 22, 1887.

MISCELLANEOUS.

PATENTEE.	NUMBER.	DATE.
Michaels & Broadwell - -	135,237	Jan. 28, 1873.
Smoke and exhaust steam.		
T. B. Field - -	161,108	Mar. 23, 1875.
Hot water heated in pipes in smoke-box.		
T. B. Collin - -	222,246	Dec. 2, 1879.
Hot water from engine or independent boiler pumped through pipes.		
F. S. Heath - -	257,325	May 2, 1882.
Hot water from engine boiler.		
E. W. Smith - -	284,682	Sept. 11, 1883.
Hot water pumped from tank in baggage car by independent pump and boiler.		
O. Bryan - -	364,799	June 14, 1887.
Smoke and exhaust steam.		
W. L. Horne - -	372,071	Oct. 25, 1887.
Hot water from engine boiler.		

CONTINUOUS HEATERS.

91

PATENTEE.	NUMBER.	DATE.
E. B. Benham -	381,754	April 24, 1888.
Products of combustion sucked through supply-pipe by fan driven from a car axle.		

FIRE-EXTINGUISHING DEVICES.

PATENTEE.	NUMBER.	DATE.
D. Williams - -	35,053	April 22, 1872.
E. H. Ashcroft -	54,662	May 15, 1866.
Reissue - -	6,653	Sept. 21, 1875.
A. C. Miner - -	78,990	June 16, 1868.
F. E. Ensign - -	208,013	Sept. 17, 1878.
F. A. White - -	254,785	Mar. 7, 1882.
R. C. Blackall - -	259,463	June 13, 1882.
A. M. Granger - -	263,401	Aug. 29, 1882.
A. M. Granger - -	262,288	Aug. 8, 1882.
G. Van Nostrand -	265,896	Oct. 10, 1882.
R. G. S. Collamore -	269,637	Dec. 26, 1882.
W. H. Havens - -	274,321	Mar. 20, 1883.
W. P. Patton - -	368,489	Aug. 16, 1887.
L. E. Truesdell - -	380,956	April 10, 1888.
F. Trowbridge - -	381,512	April 17, 1888.

GEO. P. WHITTLESEY,

Attorney at Law,

D. PRATT WRIGHT,

Mechanical Engineer,

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